Issued September 1971

SOIL SURVEY
Okeechobee County, Florida

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNIVERSITY OF FLORIDA AGRICULTURAL EXPERIMENT STATIONS

Major fieldwork for this soil survey was completed in January 1967. Soil names and descriptions were approved in July 1967. Unless otherwise indicated, statements in this publication refer to the conditions in the county in 1967. This survey was made cooperatively by the Soil Conservation Service and the University of Florida Agricultural Experiment Stations as part of the assistance furnished to the Okeechobee Soil and Water Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or can be purchased on individual order from the Cartographic Division, Soil Conservation Service, USDA, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY of Okeechobee County contains information that can be applied in managing farms, ranches, and woodlands; in selecting sites for roads, ponds, buildings, or other structures; and in judging the value of tracts of land for farming, industry, or recreation.

Locating Soils

All the soils of Okeechobee County are shown on the detailed map at the back of this survey. This map consists of many sheets that are made from aerial photographs. Each sheet is numbered to correspond with numbers shown on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" at the back of this survey can be used to find information in the survey. This guide lists all the soils of the county in alphabetic order by map symbol. It shows the page where each soil is described, and also the page for the capability unit, the range site, or any other group in which the soil has been placed.

Individual colored maps showing the relative suitability or limitations of soils for many special purposes can be developed by using the soil map and information in the text. Interpretations not included in the text can be developed by grouping the soils according to their suitability or limitations for a particular use. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitations or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of soils in the soil descriptions, and in the section that discusses management of the soils for crops and pasture, for range, for woodland, and for wildlife.

Foresters and others interested in woodland can refer to the section "Use of the Soils for Woodland" where the soils of the county are grouped according to their suitability for specified kinds of trees, and the factors that affect management of woodland are explained.

Ranchers and others interested in rangeland can find, under "Use of the Soils for Range," groupings of the soils according to their suitability for range, and also the plants that grow on each range site.

Community planners and others concerned with suburban development can get information about the soil properties that affect the choice of homesites, industrial sites, and the location of schools, playgrounds, and parks in the section "Nonfarm Uses of the Soils."

Engineers and builders will find in the section "Engineering Uses of the Soils" tables that give engineering descriptions of the soils in the county and that name soil properties that affect engineering practices and structures.

Scientists and others can read about how the soils of Okeechobee County were formed and how they are classified in the section "Formation, Morphology, and Classification of Soils."

Students, teachers, and others can find information about the soils and their management in various parts of the text.

Newcomers in Okeechobee County will be especially interested in learning general information about the county from the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County," which gives additional information about the county.

Cover picture.—Beef cattle grazing on improved pasture of pangolagrass and white Dutch clover on Pompano and Felda soils. Palm hammocks on Parkwood soils provide shelter for the cattle.

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SOIL SURVEY OF OKEECHOBEE COUNTY, FLORIDA

BY SAMUEL H. McCOLLUM AND ROBERT F. PENDLETON, SOIL CONSERVATION SERVICE[1]

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE UNIVERSITY OF FLORIDA AGRICULTURAL EXPERIMENT STATIONS

OKEECHOBEE COUNTY is in the south-central part of Florida (fig. 1). It has a total land area of 780 square miles, or 499,200 acres. Okeechobee, the county seat, is about 3 miles north of Lake Okeechobee, which forms the southern boundary of the county. This lake is the second largest fresh water lake wholly within a State.

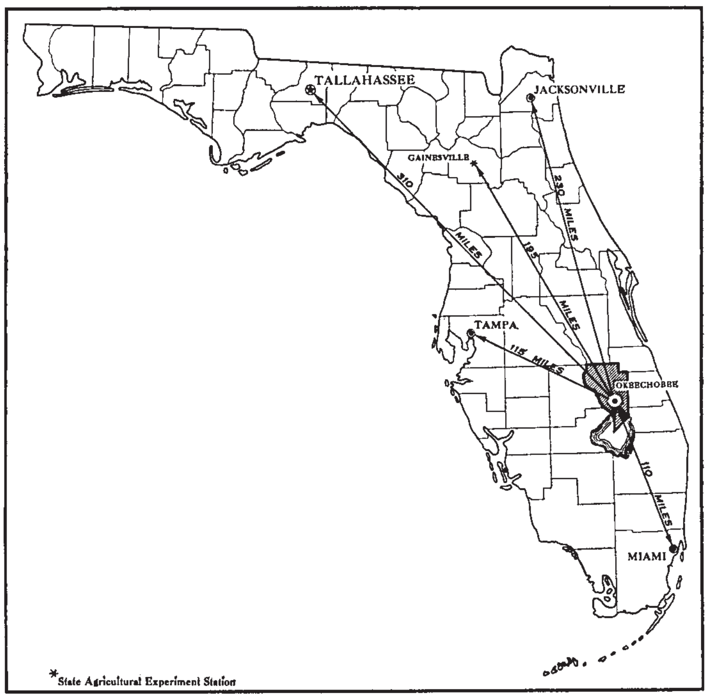

Figure 1.—Location of Okeechobee County in Florida.

Elevation in the county ranges from 15 feet above sea level, near the shoreline of Lake Okeechobee, to 75 feet in the north-central part. The average annual rainfall is about 50 inches, and the average temperature is 73° F. Rainfall is abundant, but it is unevenly distributed.

The county had a population of 12,000 in 1968, according to the Okeechobee Chamber of Commerce. Most of the people lived in the city of Okeechobee, which had a population of 7,500.

The landscape generally consists of broad, saw-palmettos and pine flatwoods; of small ponds; of long, wooded, swampy drainageways; and of many parklike hammocks. The soils generally are sandy, and most are wet to some degree.

Farming, based on the raising of livestock, is the major enterprise in the county. Much of the cash income is derived from the raising of beef cattle. These cattle graze large areas of open rangeland in the county and an increasing acreage in pastures of improved grasses. Dairying also provides much cash income, and improved pastures of high quality are maintained for dairy cattle. The most important commercial crops grown are tomatoes, watermelons, and citrus.

Sport fishing in Lake Okeechobee brings many visitors to the county, especially in winter. Commercial harvesting of catfish is a small but continuous enterprise.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Okeechobee County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. As they surveyed the county, they observed the lay of the land; the kinds of native plants or crops; the kinds of underlying rock; the drainage and water control systems; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* is the category of soil classification most used in this survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, the major horizons of all the soils of one series are similar in thickness, arrangement, and other important

[1] Others participating in the field survey were EARL S. VANATTA, JR., OTIS T. HOLLY, DAVID E. PETTRY, WARD J. AAS, CLARION S. NESETH, JR., DONALD W. OWENS, DALE E. JAKEL, and DALE E. PARKER, Soil Conservation Service.

characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Adamsville and Basinger, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Basinger fine sand and Basinger fine sand, ponded (mapped in the undifferentiated unit Basinger and Pompano fine sands, ponded), are two phases of the Basinger series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map in the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Okeechobee County: soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Basinger-Placid complex is an example.

An undifferentiated soil group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. The name of an undifferentiated group consists of the names of the dominant soils, joined by "and." Basinger and Pompano fine sands, ponded, is an example.

In some areas surveyed there are places where the soil material is so altered by man and machinery that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Made land is a land type in Okeechobee County.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for all the soils.

The soil scientists set up trial groups of soils on the basis of yield and practice tables and other data they have collected. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. Then they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Okeechobee County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a particular land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The 10 soil associations in Okeechobee County are discussed briefly in this section. They consist of nearly level soils that vary principally in wetness, thickness, texture, or acidity. More detailed information about the individual soils in each association can be obtained by studying the detailed soil map and by reading the section "Descriptions of the Soils." Use and management of the soils for farming is discussed in the section "Use and Management of the Soils." That section also describes uses of the soils for engineering and nonfarm purposes.

1. Pomello-Paola Association

Nearly level, moderately well drained soils that are sandy to a depth of more than 40 inches; on low knolls and ridges

This association consists of nearly level, very strongly acid, deep, sandy soils that are moderately well drained. These soils are adjacent to and surround small areas of lower, wetter, deep sandy soils. They occur as small dry knolls and ridges of light-colored sand near drainageways in the flatwoods. The water table, normally at a depth of about 60 inches, fluctuates between 30 and 72 inches. Most areas are in the eastern part of the county, chiefly near Fort Drum.

This association makes up about 2 percent of the county. About 60 percent of the association is Pomello soils, and most of the rest is Paola soils.

The Pomello soils have a thin surface layer of gray fine sand and a subsurface layer of nearly white fine sand that extends to a depth of more than 30 inches. A pan that consists of dark reddish-brown, very strongly acid sand, weakly cemented with organic material, normally is at a depth between 30 and 60 inches. The water table generally is at a depth between 30 and 72 inches.

The Paola soils are not so nearly white as the Pomello soils and have a weakly developed, dark-colored layer that is stained with organic matter at a depth of about 12 inches.

Most of this association has a sparse cover of native vegetation consisting of scrub oak, sand pine, slash pine, saw-palmetto, and many kinds of grasses. Because they were drier and somewhat higher than the surrounding wet land, some of the areas were selected for homesites by early settlers. Many of these have reverted to native vegetation.

The Pomello soils are poorly suited to cultivated crops because they are droughty and low in fertility. A few areas, primarily of the Paola soil, have been cleared and pastured or planted to citrus trees. This soil is moderately well suited to citrus fruits and to improved pasture. Under good management, pine trees and native grasses grow fairly well.

The soils in this association produce plants that provide some food and cover for wildlife. They also provide high areas where cattle and wildlife can find refuge in extremely wet periods.

2. Myakka-Basinger Association

Nearly level, poorly drained soils that are sandy to a depth of more than 40 inches and have an organic pan at a depth of 10 to 30 inches; on broad flatwoods and open prairies and in scattered grassy sloughs and isolated depressions

In this association are nearly level or depressional, very strongly acid, deep, sandy soils that are poorly drained. The landscape is one of broad tracts of flatwoods and open prairies and of narrow grassy sloughs and isolated shallow depressions (fig. 2). An organic pan occurs in the soils of the flatwoods and open prairies, and the water table normally is at a depth of 15 to 30 inches. During wet periods, soils of the flatwoods and prairies are saturated, and shallow water covers the soils in the sloughs.

This association makes up about 40 percent of the county. About 80 percent of the association is Myakka soils, 10 percent is Basinger soils, and the rest is Placid, St. Johns, Pompano, Pamlico, and other minor soils.

The Myakka soils occur in the flatwoods and prairies. They have a thin, dark-gray, sandy surface layer and a light-gray, sandy subsurface layer. The organic pan is within a depth of 30 inches. It is black to dark reddish brown and is weakly cemented. The Basinger soils occupy the sloughs and some depressions. They have a thin, dark-colored surface layer and a light-colored subsurface layer that typically extends to a depth of 18 inches.

***Figure 2.*—Broad areas of Myakka fine sand and shallow depressions of Basinger fine sand are typical of the Myakka-Basinger soil association. Many areas of the Basinger soil are ponded most of the time and are used to provide water for livestock.**

Brownish-colored sandy materials underlie this layer and extend deep in the soil.

Saw-palmetto, scattered stands of pine, gallberry, fetterbush, runner oak, and grasses grow on the flatwoods. The prairie areas have a cover of grasses and shrubs similar to that growing on the flatwoods but are treeless. Grasses, sedges, and rushes that tolerate wetness grow in the sloughs.

Much of this association is used for native range, but many large areas are in improved pasture. Tomatoes and watermelons are grown on newly cleared land before improved pasture is established.

If surface drainage is provided, the soils in this association are well suited to improved pasture. Intensive measures for water control are needed before the soils can be used for cultivated crops. Then under a high level of management, most areas of these soils are well suited to truck crops and to special crops. The soils generally are poorly suited to citrus fruits. If managed well, areas of this association make good range and are moderately well suited to pine trees.

This soil association is the natural habitat for many kinds of wildlife.

3. Immokalee-Pompano Association

Nearly level, poorly drained soils that are sandy to a depth of more than 40 inches; organic pan at a depth of 30 to 48 inches in most places; on broad flatwoods and in scattered grassy sloughs and depressions

This association consists of nearly level, deep, sandy soils that are poorly drained. The landscape is one of broad flatwoods, scattered grassy sloughs, and shallow isolated depressions. An organic pan occurs in the soils of the flatwoods. In the flatwoods the water table normally fluctuates between depths of 15 and 30 inches. Shallow water covers the sloughs during wet periods and stays in the depressions for most of the year.

This soil association makes up about 25 percent of the

county. About 70 percent of the association is Immokalee soil, 15 percent is Pompano soils, and the rest is Basinger, Charlotte, Delray, Placid, and other minor soils.

The Immokalee soils are in the flatwoods and are very acid. They have a thin, very dark gray, sandy surface layer and a thick, light gray to white, sandy subsurface layer. The organic pan, which is at a depth between 30 and 48 inches, is black to dark reddish brown and is weakly cemented. The Pompano soils are in the sloughs and depressions and are slightly acid. Their surface layer is dark gray and grayish brown and sandy. The underlying material also is sandy and is grayish to brownish in color.

Most of this association remains in native vegetation consisting of saw-palmetto, scattered stands of slash pine, gallberry, fetterbush, runner oak, and grasses. Many large areas are cleared and used as open range or as improved pasture. Tomatoes and watermelons are grown prior to the establishment of improved pasture. Some small areas are planted to citrus fruits.

If surface drainage is provided, the soils in this association are well suited to improved pasture. Intensive measures for water control are needed for good growth of truck crops and special crops, but citrus crops grow poorly. If managed well, areas of this association make good range and are moderately well suited to pine trees.

This association is the natural habitat for many kinds of wildlife.

4. Parkwood-Bradenton-Wabasso Association

Nearly level, poorly drained, sandy soils that have a loamy or marly layer at a depth of less than 40 inches; on palm hammocks and the interspersed pine flatwoods

This association consists of nearly level, neutral to mildly alkaline, poorly drained, sandy soils that are shallow to calcareous material and of slightly acid to very strongly acid, sandy soils that have a loamy subsoil. The landscape is one of palm hammocks interspersed with pine flatwoods and a few ponds. The water table is normally at a depth of 15 to 30 inches, but during wet seasons it rises to near the surface.

This association makes up about 1 percent of the county. About 35 percent of the association is Parkwood soil, 25 percent is Bradenton soil, 25 percent is Wabasso soil, and the remaining 15 percent is Delray, Felda, Ft. Drum, Manatee, Myakka, Pompano, and other minor soils.

The Parkwood soils are on the palm hammocks. They have a dark-colored, sandy surface layer underlain by calcareous, marly material at a depth of 9 to 18 inches. The Bradenton soils occur in both the palm hammock and pine flatwood areas. They have a medium acid to neutral, sandy surface layer that overlies a loamy subsoil and a calcareous substratum. The Wabasso soils are in the pine flatwoods. These soils have a very strongly acid, sandy surface layer and a neutral to mildly alkaline, loamy subsoil. An organic pan occurs at a depth of 12 to 30 inches.

Most of this association is used for native range. In the palm hammock areas the vegetation is mainly cabbage-palm, but oak and pine grow in some areas. The undergrowth consists of sparse stands of grasses, shrubs, and vines. In the pine flatwoods, the vegetation consists of saw-palmetto, scattered pines, gallberry, fetterbush, runner oak, and many kinds of grasses.

If surface drainage is provided, the soils in the pine flatwoods are well suited to improved pasture. The palm hammocks produce little forage, and improving such areas for pasture would not justify the cost. The most economical method generally is to improve only the flatwood areas and to use the hammocks to provide shade and shelter for the cattle. If intensive measures for water control are used, the soils in this association are well suited to truck crops and citrus fruits. Only a small acreage, however, is used for citrus.

This association provides good feeding, shelter, and nesting areas for many kinds of wildlife.

5. Placid-Pamlico-Delray Association

Nearly level, very poorly drained soils that are sandy to a depth of more than 40 inches and organic soils; in swamps and heavily wooded drainageways

In this association are deep, very strongly acid to mildly alkaline, sandy soils and acid muck and peat soils. All of these soils are nearly level and are very poorly drained. The landscape is one of heavily wooded swamps and cypress trees along the courses of sluggish natural drainageways (fig. 3). Shallow, slow-moving water covers the areas most of the time. The largest areas of this association are in the eastern part of the county where natural drainage is better developed.

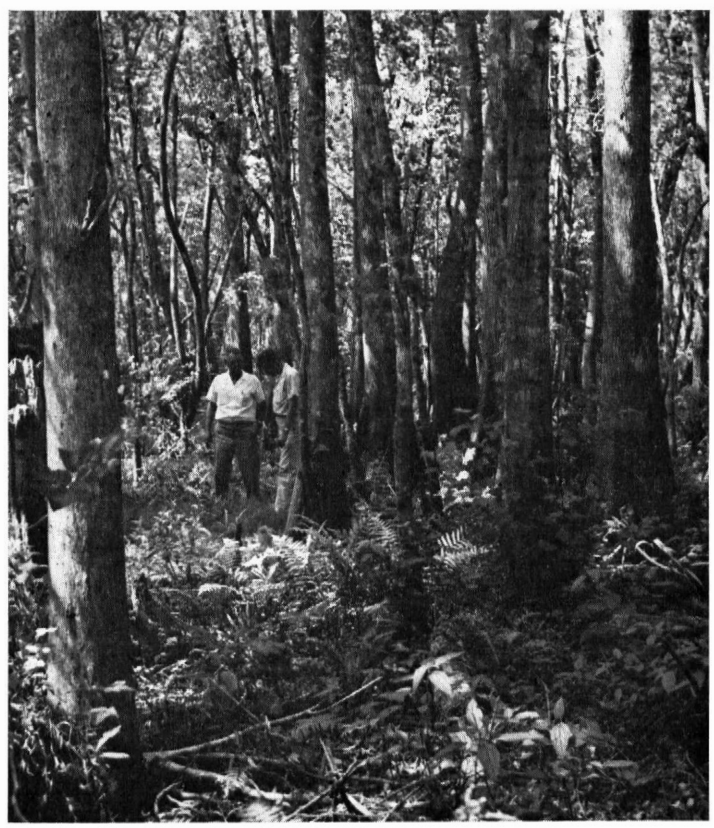

Figure 3.—Typical landscape in the Placid-Pamlico-Delray association.

About 5 percent of the county is in this association. The Placid soils make up about 40 percent of the association; the Pamlico soil, about 20 percent; the Delray soils, 20 percent; and the Basinger, Felda, Okeelanta, Pompano, and other minor soils, the remaining 20 percent.

The Placid soils are very strongly acid, deep, sandy soils that have a thick, dark-colored surface layer. The Pamlico soils consist of layers of very strongly acid, black muck 12 to 36 inches thick. This muck overlies sandy material and contains some small areas of acid peat. The Delray soils are similar to the Placid soils but are slightly acid to mildly alkaline. They have a subsoil of fine sandy loam at a depth between 40 and 60 inches.

Most areas of this association have a dense cover of wetland hardwood trees, such as sweetbay, sweetgum, swamp maple, cypress, and water oak, and a dense undergrowth of ferns, vines, and shrubs. In small open areas are sawgrass and other marsh grasses, pickerelweed, rushes, and other aquatic plants. Pure stands of cypress are also common.

The heavily wooded swamps generally are not feasible to clear and drain for farming. These areas are more useful if left in native vegetation and used for trees and as wildlife habitat. Some marsh areas provide excellent grazing if used as rangeland.

This association provides good natural habitat for many kinds of wildlife.

A few marsh areas in this association have adequate drainage outlets and can be developed for improved pasture. Such areas also are well suited to truck crops if intensive measures for water control are practiced. After the organic soils of this association are drained and reclaimed, subsidence and oxidation are constant hazards.

6. Pompano-Charlotte-Delray-Immokalee Association

Nearly level, mainly poorly drained soils that are sandy to a depth of more than 40 inches; in broad grassy sloughs and depressions and on small scattered palmetto flats

In this association are nearly level, poorly drained, medium acid to neutral, deep, sandy soils and similar soils that are very poorly drained and have a dark surface layer and a loamy subsoil. The landscape is one of broad grassy sloughs and many shallow depressions and intermittent ponds, as well as small scattered palmetto flats with clumps of palms. For short periods during the wet season, shallow water covers much of this association. The depressions and intermittent ponds are covered with shallow water most of the time.

This association makes up about 12 percent of the county. About 40 percent of the association is Pompano soils; about 20 percent is Charlotte soils; and about 30 percent is Delray and Immokalee soils, in equal parts. The remaining 10 percent consists of such minor soils as Elred, Felda, and Ft. Drum.

Pompano soils are poorly drained, deep, light-colored and sandy and occur in sloughs and depressions. The Charlotte soils also occur in sloughs and depressions and are similar to Pompano soils, except that they have a brighter colored, brownish-yellow to yellowish-brown, sandy subsoil. Delray soils occupy depressions and ponds and have a thick, dark-colored sandy surface layer and a loamy subsoil at a depth of 40 to 60 inches. The Immokalee soils are on small islands and ridges scattered throughout the association. They are very strongly acid and sandy and have an organic pan at a depth below 30 inches.

Most areas of this association are used for native range. The vegetation consists of grasses and many grasslike sedges and rushes.

If surface drainage is provided, the soils in this association are well suited to improved pasture. As much as 25 percent of the association has been developed for such use. Intensive measures for water control are needed for growth of cultivated crops. Then if other good management is provided, these soils are fairly well suited to truck crops.

The native vegetation in this association makes good range and is a natural habitat for many kinds of wildlife.

7. Manatee-Delray-Okeelanta Association

Nearly level, very poorly drained, sandy soils that in most places have a loamy layer at a depth of less than 40 inches and organic soils; on flood plains of major streams and other lowlands

In this association are nearly level, slightly acid to neutral, very poorly drained, sandy soils and organic soils. The sandy soils have a dark-colored surface layer and a neutral to calcareous loamy subsoil. Interspersed within areas of these sandy soils are small- to medium-sized areas of slightly acid to neutral organic soils. This association generally is on bottom lands in the flood plains of the Kissimmee River and Taylor Creek and in lowlands adjacent to Lake Okeechobee. The flood plains are dissected by many old stream meanders, oxbows, and discontinuous natural dikes. Major drainage and water control works recently have been established on most soils in this association, and only small areas or depressions now are subject to frequent flooding.

This association makes up about 6 percent of the county. About 45 percent of the association is Manatee soils, 25 percent is Delray soils, and 15 percent is Okeelanta soils. The remaining 15 percent is made up of such minor soils as the Chobee, Felda, and Pompano, and of alluvial soils, old stream channels, and open areas of water.

The Manatee soils have a thick, black loamy fine sand surface layer and a dark-colored fine sandy loam subsoil. Calcareous underlying material is at a depth of about 36 inches. The Delray soils have a thick, black sandy surface layer and a thick, gray sandy subsurface layer. A mildly alkaline loamy subsoil is at a depth between 40 and 60 inches. The Okeelanta soils are slightly acid to neutral, black to very dark brown peat underlain by sandy material at a depth of less than 36 inches.

Most areas of this association are on flood plains of the Kissimmee River and of Taylor Creek. They have a cover of native vegetation that consists mainly of black willow, sawgrass, flags, and of grasses that tolerate wet-

ness. In a few areas, however, clumps of cypress trees and cabbage-palms grow.

The soils in this association are used mainly for native range and for wildlife, though some fringe areas are in semi-improved pasture. Most of the lowlands near Lake Okeechobee have been drained and are used for improved pasture.

Although most areas of this association are now protected from flooding, further water control is needed for most kinds of farming. Much of the acreage is well suited to improved pasture. Under good management that includes drainage and other water control measures, truck crops and special crops grow well, but citrus crops grow poorly. If managed well, areas of this association make good range.

The densely vegetated flood plains of this association are a good natural habitat for many kinds of wildlife.

8. Felda-Wabasso Association

Nearly level, poorly drained, sandy soils that have a loamy layer at a depth of less than 40 inches; in grassy sloughs and depressions and on scattered, slightly elevated islands of flatwoods

This association consists of poorly drained soils in nearly level, low, broad, grassy sloughs and shallow depressions, and on scattered flatwood islands and small palm hammocks. The soils in the sloughs have a strongly acid to slightly acid sandy surface layer underlain by a neutral to mildly alkaline, loamy subsoil. The soils of the flatwoods have strongly acid to very strongly acid, sandy surface layers. Below is an organic pan and a neutral to mildly alkaline, loamy subsoil. Shallow water covers the sloughs only during the wet seasons, but the depressions are under water for most of the year. This association occupies several small areas in the county, but the major area is in the northeastern corner.

This association makes up about 5 percent of the county. About 45 percent of the association is the Felda soils, 30 percent is the Wabasso soil, and the remaining 25 percent is made up of such minor soils as the Charlotte, Delray, Elred, and Pompano in slough areas, and the Bradenton, Immokalee, and Myakka in flatwoods and hammock areas.

The Felda soils are in sloughs. They have a thin surface layer of dark-colored fine sand underlain by a subsurface layer of grayish-brown to light-gray fine sand. The subsoil is gray fine sandy loam to dark-gray loamy fine sand and has yellowish mottles. The Wabasso soils are in the flatwoods. They have a thin surface layer of dark-colored fine sand underlain by a subsurface layer of gray fine sand. An organic pan is at a depth of about 12 to 30 inches. Below are thin, sandy layers underlain by mottled, light-gray to yellowish-brown fine sandy loam.

Most areas of this association remain in native vegetation and are used as range. In the sloughs and depressions, the vegetation consists of St. Johnswort, maidencane, pickerelweed, grasses, and sedges. In the flatwoods, the native vegetation consists of saw-palmetto, gallberry, runner oak, scattered pine trees, and clumps of cabbage-palm. Some large areas are in improved pasture, and a few small areas are used for citrus.

If managed well, native range on these soils produces good forage. If surface drainage is provided, most of these soils are suitable for improved pasture. Intensive measures for water control are needed before these soils can be used for cultivated crops. Then if management otherwise is good, citrus fruits and truck crops can be grown.

This association provides good natural feeding and nesting grounds for many kinds of wildlife.

9. Felda-Pompano-Parkwood Association

Nearly level, poorly drained, sandy soils that have a loamy subsoil and deep sands, in sloughs and marshes; interspersed with poorly drained sandy soils that are shallow to marl and are on palm hammocks

In this association are nearly level, poorly drained, sandy soils. Some of these soils are strongly acid to neutral; others are slightly acid to mildly alkaline and are shallow to calcareous material (marl). Some of the strongly acid to neutral soils have a neutral to mildly alkaline subsoil. The landscape is one of broad grassy marshes; shallow intermittent ponds; and small to large, slightly elevated palm hammocks. Shallow water covers much of this association during the wet season, and the deep depressions for most of the year. The largest areas of this association are in the north-central part of the county.

This association makes up about 2 percent of the county. About 40 percent is Felda soils, 30 percent is Pompano soils, and 15 percent is Parkwood soil. The remaining 15 percent consists of Bradenton, Charlotte, Delray, Ft. Drum, Manatee, Okeelanta, and other minor soils.

The Felda soils are in marshy areas and sloughs. They have a sandy surface layer and a loamy subsoil. The Pompano soils are similar to the Felda soils but lack the loamy subsoil typical of the Felda soils. They occur mainly around the edges of the marshy areas and also in some shallow ponds. The Parkwood soils occur in the hammock areas. They have a dark-colored, sandy surface layer that is underlain by calcareous material at a depth between 10 and 18 inches.

Much of this association is undeveloped and used for native range and as wildlife habitat. Some areas in the wetlands are in improved pasture, and one small area is used for citrus crops. In the wetlands the native vegetation consists of maidencane, sawgrass, and other grasses and plants that tolerate wetness. In the hammocks the native vegetation consists of cabbage-palms, oaks, and an undergrowth of various kinds of shrubs, vines, and grasses.

Where drainage is feasible, much of the acreage of this association is well suited to improved pasture. The hammocks generally provide shelter for cattle that graze in adjacent pastures. Intensive measures for water control are needed before the soils in this association can be used for cultivated crops. Then if other good management also is used, most areas are well suited to truck crops and to citrus fruits. The native grasses on the wetland soils provide good grazing when used for range.

10. Okeelanta-Delray-Pompano Association

Nearly level, very poorly drained organic soils in broad sawgrass marshes and the adjacent wet sandy soils

In this association are nearly level, very poorly drained organic soils and adjacent wet sandy soils. The organic soils are slightly acid to mildly alkaline, and the sandy soils are light colored to dark colored and medium acid to mildly alkaline. The landscape is one of large sawgrass marshes and adjacent grassy sloughs. Shallow water covers the marshes for most of the year and most of the sloughs during the wet season. The association occurs primarily near Yates Marsh, Dark Hammock, in areas 4 to 6 miles northeast of the city of Okeechobee, and along the northern and eastern borders of Lake Okeechobee.

This association makes up about 2 percent of the county. About 40 percent is Okeelanta soils, 20 percent is Delray soils, and 15 percent is Pompano soils. The remaining 25 percent consists of Felda, Manatee, Placid, Terra Ceia, and other minor soils. Along the eastern border of Lake Okeechobee the proportion of Delray soils is larger and the proportion of Okeelanta soils is smaller than in most other areas of this association.

The Okeelanta soils consist of layers of black to very dark brown, fibrous peat, 12 to 36 inches thick, underlain by neutral sand. The Delray soils have a thick, black, sandy surface layer, a thick gray subsurface layer, and a loamy layer in the subsoil at a depth of 40 to 60 inches. The Pompano soils have a thin surface layer of dark-gray fine sand. Below is light-colored fine sand to a depth of 72 inches or more.

In the marshes the native vegetation consists mainly of sawgrass, but pickerelweed and a few scattered cypress trees grow in some places. On the adjacent wetlands, the native vegetation consists of pickerelweed and of grasses and other plants that tolerate wetness.

Where drainage is feasible, the soils of the marshes are well suited to truck crops or to improved pasture. After drainage, however, subsidence and oxidation are constant hazards. The soils in the sandy wetlands adjacent to the marshes are well suited to truck crops and are especially well suited to improved pasture. Before any of the soils in this association can be used for cultivated crops, intensive measures are needed for water control.

About two-thirds of the acreage of this association is in improved pasture. The remaining acreage is in native vegetation and makes fair range. It also serves as natural habitat for many kinds of wildlife.

Descriptions of the Soils

In this section the soils and land types of Okeechobee County are described. Following the name of each soil and land type is the symbol that identifies that unit on the detailed soil map at the back of this publication. For each kind of soil there is a short description of a typical soil profile and a much more detailed description of the same profile that scientists, engineers, and others can use in making highly technical interpretations.

Listed at the end of a mapping unit are the capability unit, the range site, and the woodland suitability group in which the mapping unit has been placed. The "Guide to Mapping Units" at the back of this survey lists the pages where each of these groups and the mapping units are described. Many terms used in the soil descriptions are defined in the Glossary and in the Soil Survey Manual (*6*).[2] The acreage and the proportionate extent of the mapping units are shown in table 1.

Adamsville fine sand (Ad).—This somewhat poorly drained, nearly level, deep, sandy soil is along the fringes of flatwoods areas that border sloughs and ponds. The areas are small and occur throughout much of the county.

In a typical profile the surface layer is fine sand about 12 inches thick. It is dark gray in the upper part and dark grayish brown in the lower part. The next layer is grayish-brown fine sand about 10 inches thick. Below a depth of about 22 inches is lighter colored fine sand. The water table normally is at a depth of about 30 inches.

Typical profile of Adamsville fine sand (directly south of Old Dixie Highway, about 1½ miles southwest of the center of Okeechobee):

A11—0 to 6 inches, dark-gray (10YR 4/1) fine sand; weak, fine, crumb structure; very friable; has a salt-and-pepper appearance in places because of mixing of organic matter and light-gray sand; many fine, medi-

[2] Italic numbers in parentheses refer to Literature Cited, p. 59.

TABLE 1.—*Approximate acreage and proportionate extent of soils*

Soil	Area	Extent
	Acres	*Percent*
Adamsville fine sand	8, 000	1. 6
Basinger fine sand	16, 000	3. 2
Basinger-Placid complex	5, 000	1. 0
Basinger and Pompano fine sands, ponded	10, 000	2. 0
Borrow pits	200	(1)
Bradenton fine sand	3, 000	. 6
Charlotte fine sand	10, 000	2. 0
Chobee fine sandy loam	1, 000	. 2
Delray fine sand	12, 000	2. 4
Delray fine sand, thin solum variant	2, 500	. 5
Elred fine sand	3, 000	. 6
Felda fine sand	8, 000	1. 6
Felda, Pompano, and Placid soils, ponded	10, 000	2. 0
Ft. Drum fine sand	2, 000	. 4
Immokalee fine sand	130, 000	26. 0
Made land	1, 400	. 3
Manatee loamy fine sand	3, 000	. 6
Manatee, Delray, and Okeelanta soils	15, 000	3. 0
Myakka fine sand	156, 500	31. 4
Okeelanta peat	3, 200	. 6
Pamlico muck	6, 800	1. 4
Paola fine sand	2, 000	. 4
Parkwood fine sand	4, 000	. 8
Placid fine sand	12, 000	2. 4
Placid, Pamlico, and Delray soils, ponded	15, 000	3. 0
Pomello fine sand	10, 000	2. 0
Pompano fine sand	32, 000	6. 4
Seewee fine sand	600	. 1
Spoil banks	3, 000	. 6
St. Johns sand	3, 000	. 6
Terra Ceia peat	2, 000	. 4
Wabasso fine sand	9, 000	1. 8
Total	499, 200	100. 0

[1] Less than 0.05 percent.

um, and coarse roots; medium acid; clear, smooth boundary.

A12—6 to 12 inches, dark grayish-brown (10YR 4/2) fine sand; single grain; loose; common, fine, medium, and coarse roots; medium acid; gradual, wavy boundary.

C1—12 to 22 inches, grayish-brown (10YR 5/2) fine sand; many, fine and medium, distinct, dark grayish-brown (10YR 4/2) and very dark grayish-brown (10YR 3/2) mottles; common, medium, faint, light brownish-gray (10YR 6/2) and pale-brown (10YR 6/3) mottles; and a few, fine and medium, yellowish-red (5YR 4/6) mottles; single grain; loose; common fine roots; slightly acid; gradual, wavy boundary.

C2—22 to 28 inches, very pale brown (10YR 7/4) fine sand; common, medium and coarse, brownish-yellow (10YR 6/8) mottles; single grain; loose; olive-brown iron concretions; a few fine roots; slightly acid; gradual, wavy boundary.

C3—28 to 42 inches, white (10YR 8/2) fine sand; a few, fine and medium, light olive-brown (2.5Y 5/4) mottles; single grain; compact in place, loose when crushed; a few, large pockets of olive-brown loamy fine sand in the lower 1 to 2 inches; mildly alkaline; clear, smooth boundary.

C4—42 to 70 inches +, light-gray (10YR 7/2) fine sand; a few, medium, faint, light brownish-gray (10YR 6/2) and grayish-brown (10YR 5/2) mottles; single grain; loose; mildly alkaline.

The soil texture is fine sand to a depth of more than 72 inches. Reaction in the A horizon ranges from medium acid to neutral, and in the C horizon it ranges from slightly acid to mildly alkaline. The A11 horizon ranges from gray to very dark gray and is 4 to 8 inches thick. The A12 horizon ranges from dark gray and dark grayish brown to light gray, and it is 4 to 12 inches thick. The C1 and C2 horizons are grayish brown to very pale brown. These horizons are generally mottled with brownish yellow, and some iron concretions are also present. The C3 and C4 horizons are white to light gray and are mottled in places. The water table is at a depth of 15 to 30 inches for 2 to 6 months of the year. It rises above 15 inches for short periods during the wet season and drops below 30 inches during the dry season.

Included with this soil in mapping are small areas of Charlotte, Pompano, Ft. Drum, Elred, and Immokalee soils. This soil has better drainage than the Charlotte and Pompano soils, but it lacks the fine sandy loam Bca layer of the Ft. Drum soil and the loamy subsoil of the Elred soil. It is less acid than the Immokalee soil and lacks an organic pan typical of that soil.

Adamsville fine sand is rapidly permeable and responds well to simple drainage practices. Available water capacity is low, and the soil is likely to be droughty when drained. Fertility and content of organic matter are low.

The native vegetation consists of pine trees, saw-palmetto, many kinds of native grasses and shrubs, and a few cabbage-palms. In some areas the pine trees have been removed or thinned. Most other areas remain in native vegetation and are used for range, to which they are well suited. This soil is also well suited to improved pasture if a drainage system is provided that removes excess surface water. If complete water control is provided, this soil is well suited to truck and special crops and is moderately well suited to citrus. Capability unit IVw-1; Sweet Flatwoods range site; woodland group 2.

Basinger fine sand (Ba).—This deep, poorly drained, nearly level, sandy soil is in grassy sloughs. Though areas are generally small, they occur in all parts of the county.

In a typical profile the surface layer is strongly acid, very dark gray fine sand about 2 inches thick. The subsurface layer is light-gray fine sand about 16 inches thick. The next layer is light brownish-gray and brown fine sand that contains darker brown, weakly cemented fragments. Below is light-colored sand. The water table normally is at a depth of about 20 inches.

Typical profile of Basinger fine sand (250 feet west of Jim Durrance Road and 4½ miles northeast of Basinger):

A1—0 to 2 inches, fine sand that is very dark gray (10YR 3/1) when rubbed; weak, fine, crumb structure; very friable; many fine roots; many, clean, light-gray sand grains; strongly acid; clear, smooth boundary.

A2—2 to 18 inches, light-gray (10YR 7/2) fine sand; single grain; loose; a few, fine and medium roots; very strongly acid; clear, wavy boundary.

C&Bh—18 to 36 inches, light brownish-gray (10YR 6/2) and brown (10YR 5/3) fine sand; a few, fine, faint, yellowish-brown mottles; single grain; loose; common weakly cemented fragments; a few, fine and medium roots; many clean sand grains; strongly acid; gradual, wavy boundary.

C—36 to 60 inches +, light brownish-gray (10YR 6/2) fine sand; single grain; loose; strongly acid.

The texture is fine sand to a depth of more than 72 inches, and the reaction ranges from strongly acid to very strongly acid throughout the soil. The A1 horizon ranges from gray to black and is 2 to 8 inches thick. It is less than 6 inches thick in most places where it is very dark gray or black. The A2 horizon ranges from gray to white and is 6 to 20 inches thick. Narrow, grayish-brown to very dark gray stains occur in root channels that extend into the A2 horizon. The C&Bh horizon is 6 to 30 inches thick. Its fine sand is brownish and the weakly cemented fragments in it are darker brown. The mottles in this horizon are few to many, fine to medium, and of lighter or darker brown than the matrix material. In a few places, iron concretions are in this horizon. The C horizon is brown to light-gray sand or fine sand that is mottled in places. The water table is at a depth of 0 to 15 inches for 2 to 6 months of the year. A few inches of water covers the surface during wet seasons.

Included with this soil in mapping are small areas of the Immokalee, Myakka, Placid, and Pompano soils. Basinger fine sand has a much thinner A1 horizon than Placid soils. It lacks the well-developed organic pan that typifies Myakka and Immokalee soils. It is similar to Pompano soils but has a C&Bh horizon with weakly cemented fragments, and it also has a much thinner A1 horizon.

Although Basinger fine sand is wet for long periods, it is rapidly permeable and responds readily to simple drainage practices. If it is deeply drained, this soil is droughty during dry periods because its available water capacity is low. It leaches rapidly. Fertility and content of organic matter are low.

Most areas of Basinger fine sand are in native grasses and small shrubs. Waxmyrtle, cypress, and scattered pine trees grow in some areas. This soil is suited to improved pastures if a drainage system is provided that removes excess surface water rapidly. Tomatoes and watermelons grow in a small acreage that has been ditched, pumped, and bedded. This soil is poorly suited to citrus. Capability unit IVw-3; Slough range site; woodland group 7.

Basinger-Placid complex (Bc).—The soils in this complex occur together in low places in wide sloughs and in isolated depressions in acid flatwoods areas. Most areas are covered with shallow water throughout the year.

Most of this complex is in the eastern half of the county. The Basinger soils are similar to Basinger fine sand except that water covers the surface most of the time. The Placid soils are similar to Placid fine sand but normally are ponded for longer periods.

In most areas the Basinger soils are near the perimeter of the depressions, where ponding is shallowest; the Placid soils are in the center, where ponding is deepest and persists the longest. Small pockets of organic soils occur near the center of some depressions. Basinger soils make up 50 to 75 percent of most areas. The rest is made up almost entirely of Placid soils.

These soils generally are not suitable for most culti-

vated crops. Most areas are small and lack natural drainage outlets. Drainage and development of such areas for cultivated crops generally is not feasible. The native grasses on these soils are excellent for grazing and grow well under good range management.

The native vegetation is mainly maidencane, St. Johnswort, and grasses that tolerate wetness. Many areas should be kept in their native state and used as feeding grounds for waterfowl and as ponds for watering livestock. If excess water is removed, these soils are suited to pine trees. Capability unit Vw–1; Sand Pond range site; woodland group 7.

Basinger and Pompano fine sands, ponded (Bm).—This undifferentiated unit consists of deep, nearly level, sandy soils that are poorly drained. These soils occur throughout the county in low places in sloughs and in isolated depressions in the flatwoods. Most areas mapped are either Basinger fine sand or Pompano fine sand, but these two soils rarely are together in the same mapped area. A typical profile of each of these soils is described in the mapping units Basinger fine sand and Pompano fine sand. The two soils differ in acidity, but accurate reaction is difficult to obtain because the soil is covered by water most of the year.

Included in mapping with this unit where Basinger soils are dominant are small areas of such soils as the Immokalee, Myakka, and Placid. Basinger soils lack the well-developed organic pan typical of Immokalee and Myakka soils and have a thinner, lighter colored surface layer than Placid soils.

Where Pompano soils are dominant, Delray and Felda soils are included with this unit in mapping. Pompano soils typically lack the thick, black surface layer and loamy subsoil of the Delray soils and the loamy subsoil of the Felda soils. A few small areas of organic soils in deep pockets are also included in mapping.

Most areas of these soils are small and lack drainage outlets. They therefore are undeveloped and are used as native range. The native vegetation consists mainly of maidencane, St. Johnswort, water lilies, and grasses, pickerelweed, and other plants that tolerate wetness.

Complete water control measures normally are difficult to provide, and most areas generally are not suited to cultivated crops. Under good management native grasses in open range provide good grazing for cattle. Most areas, however, are used to provide watering places for livestock and feeding areas for waterfowl. Capability unit Vw–1; Sand Pond range site; woodland group 7.

Borrow pits (Bo).—This land type consists of manmade excavations from which the soil material has been removed for use in road construction. It includes waste material that is piled along the sides of the pits. The areas occur along most major roads in the county and are mostly 5 acres or less in size.

Most areas of this land type have been excavated below the normal water table and are ponded for 9 months or more each year. Many of the areas are within improved pasture and range and serve as stockwater ponds. Ponded areas of this unit are used by wading birds and waterfowl. Many of these ponds can be stocked with fish. Not placed in a capability unit, range site, or woodland group.

Bradenton fine sand (Br).—This poorly drained, nearly level soil is in low flatlands and hammock areas that border sloughs, ponds, and marshes.

In a typical profile the surface layer is medium acid, very dark gray fine sand about 4 inches thick. The subsurface layer is grayish-brown fine sand about 6 inches thick. The subsoil is dark-gray to gray fine sandy loam that is mottled with yellowish brown and olive brown. It is about 16 inches thick and is mildly alkaline in the lower part. Below are layers of white and light brownish-gray calcareous fine sandy loam that extends to a depth of more than 70 inches. The water table normally is at a depth of 15 to 30 inches.

Typical profile of Bradenton fine sand (in a hammock area, 2½ miles west of U.S. Highway No. 441 and 8 miles north of the center of Okeechobee):

A1—0 to 4 inches, very dark gray (10YR 3/1) fine sand; weak, fine, crumb structure; very friable; has a salt-and-pepper appearance in places because of mixing of organic matter and light-gray sand; many fine and medium roots; medium acid; clear, smooth boundary.

A2—4 to 10 inches, grayish-brown (10YR 5/2) fine sand; single grain; loose; many fine, medium, and coarse roots; medium acid; abrupt, smooth boundary.

B21tg—10 to 19 inches, dark-gray (10YR 4/1) fine sandy loam; many, fine and medium, distinct, yellowish-brown (10YR 5/6, 5/8) mottles; weak, medium, subangular blocky structure; friable, slightly sticky; common fine and medium roots and many coarse roots; a few, thin, discontinuous clay films on ped faces and in root channels; clay bridging of sand grains; slightly acid; gradual, wavy boundary.

B22tg—19 to 26 inches, gray (10YR 5/1) fine sandy loam; a few, fine, distinct, yellowish-brown (10YR 5/6) and olive-brown (2.5Y 4/4) mottles; weak subangular blocky structure; slightly sticky, friable; a few medium and coarse roots; sand grains coated with clay; common, fine, white marl nodules or small pockets of marl in lower 4 inches; mildly alkaline; gradual, wavy boundary.

C1ca—26 to 34 inches, white (N 8/0) fine sandy loam (marl); massive; nonsticky, slightly plastic; common streaks and pockets of grayish-brown fine sandy loam; sand grains coated with marl; calcareous; clear, wavy boundary.

C2ca—34 to 70 inches +, light brownish-gray (2.5Y 6/2) fine sandy loam; common, medium, distinct, light olive-brown (2.5Y 5/6) mottles and a few, fine, distinct, olive-brown (2.5Y 4/4) mottles; massive; slightly sticky, slightly plastic; many small pockets and nodules of semihard white marl; some sand grains cemented with marl; calcareous.

The gray to black A1 horizon is 4 to 8 inches thick. If this layer is black or very dark gray it generally is less than 6 inches thick. The A2 horizon is grayish brown to light gray and is 4 to 10 inches thick. Reaction in the A horizon ranges from medium acid to neutral. The B horizon is slightly acid to mildly alkaline, mottled dark-gray to light-gray fine sandy loam. Depth to the B horizon ranges from 10 to 18 inches. The Cca horizon ranges from gray to white. The water table is at a depth of 0 to 15 inches for 1 or 2 months during the wet season.

Included with this soil in mapping are small areas of Wabasso, Felda, Parkwood, and Ft. Drum soils. This soil lacks the well-developed organic pan typical of the Wabasso soil and the thick loamy subsoil typical of the Felda soil. Depth to the Cca, or marl layer, in the Bradenton soil is greater than in the Parkwood and Ft. Drum soils.

Although Bradenton fine sand is periodically wet, it is moderately to rapidly permeable and responds readily to simple drainage practices. Available water capacity is low in the sandy surface layer but is more favorable in the loamy subsoil. Fertility is low to moderate, and content of organic matter is low.

Most areas of this soil remain in native vegetation that consists of open pinewoods and an understory of saw-palmettos, native grasses, and shrubs. Individual cabbage-palms and small palm hammocks are common and are used primarily for native range. When properly managed for range, native grasses grow well in open areas of pinewoods. The hammock areas provide shelter and limited browse. Under good management that includes measures for water control, this soil is well suited to citrus, to improved pasture, and to special truck crops. Crops on this soil respond well if fertilizer is added. Capability unit IIIw-1, Sweet Flatwoods and Hammock range sites; woodland group 3.

Charlotte fine sand (Ch).—This deep, poorly drained, nearly level, sandy soil is in low, grassy sloughs. It occurs in all parts of the county but is most extensive in the northwestern part.

In a typical profile the surface layer is slightly acid, very dark gray fine sand about 6 inches thick. The subsurface layer is neutral, grayish-brown fine sand about 13 inches thick. The subsoil is brownish-yellow and yellowish-brown fine sand about 27 inches thick. The underlying material, to a depth of 75 inches or more, is white fine sand. The water table normally is at a depth of about 24 inches.

Typical profile of Charlotte fine sand (8½ miles southwest of Fort Drum and 2½ miles north of Eagle Island Road):

Ap—0 to 6 inches, very dark gray (10YR 3/1) crushed fine sand; weak, fine, crumb structure; very friable; many fine grass roots; slightly acid; clear, smooth boundary.

A2—6 to 19 inches, grayish-brown (10YR 5/2) fine sand; single grain; loose; many clean sand grains; many fine grass roots; neutral; clear, wavy boundary.

B2ir—19 to 30 inches, brownish-yellow (10YR 6/8) fine sand; single grain; loose; a few fine roots; yellowish coatings on sand grains; mildly alkaline; gradual, wavy boundary.

B3ir—30 to 46 inches, yellowish-brown (10YR 5/4) fine sand; a few, coarse, distinct, very pale brown (10YR 7/4) mottles and common, medium, distinct, dark grayish-brown (10YR 4/2) and dark yellowish-brown (10YR 4/4) mottles; single grain; nonsticky; many clean sand grains; a few fine roots; a few iron concretions 1 centimeter or less in size; mildly alkaline; clear, wavy boundary.

C—46 to 75 inches +, white (10YR 8/1) fine sand; single grain; nonsticky; mildly alkaline.

The Ap horizon is gray to black and is 2 to 8 inches thick. The A2 horizon is gray to grayish brown and light gray and is 6 to 20 inches thick. Depth to the brighter colored Bir horizon is as little as 8 inches or as much as 30 inches. This horizon ranges from yellowish brown to yellow and is 8 to 36 inches thick. The C horizon is yellowish brown to white fine sand that has brownish mottles and contains small iron concretions. Reaction is medium acid to neutral in the A horizon and neutral to mildly alkaline in the Bir and C horizon. The water table drops to a depth of about 48 inches during prolonged dry periods but rises to a few inches above the surface for short periods in the wet season.

Included with this soil in mapping are small areas of Pompano, Immokalee, and Delray soils. This soil contains a brownish-yellow subsoil (Bir horizon) that is lacking in the Pompano soil. It lacks the thick, black surface layer of the Delray soil and the well developed organic pan that is below a depth of 30 inches in the Immokalee soil.

Charlotte fine sand is rapidly permeable, and if fertilizer is applied, it leaches out rapidly. If this soil is deeply drained, it is droughty during dry seasons because its available water capacity is low. Fertility and content of organic matter also are low.

Most areas of this soil remain in undeveloped sloughs that have a cover of native grasses and are used as range. Some areas are in improved pasture that provides excellent grazing. A small acreage is used for tomatoes and citrus. These crops require complete water control and other good management. Capability unit IVw-3; Slough range site; woodland group 7.

Chobee fine sandy loam (Co).—This very poorly drained, nearly level soil is in depressions and drainageways. It occurs primarily in the south-central part of the county near Taylor Creek.

In a typical profile the surface layer is slightly acid, black fine sandy loam about 7 inches thick. The subsoil is mildly alkaline, black sandy clay loam in the upper 15 inches. Below is very dark gray and dark-gray sandy clay loam that has many specks of white marl. At a depth of about 63 inches is gray loamy fine sand. The water table is near or above the surface most of the year.

Typical profile of Chobee fine sandy loam (about 6½ miles northeast of the center of Okeechobee and 2¼ miles east of U.S. Highway No. 441):

Ap—0 to 7 inches, black (10YR 2/1) fine sandy loam; moderate, medium, granular structure; friable; many, fine and medium grass roots; content of organic matter is 10 to 15 percent; a few, small, gray sand pockets; many clean sand grains; slightly acid; clear, smooth boundary.

B21t—7 to 22 inches, black (10YR 2/1) sandy clay loam; weak, coarse, subangular blocky structure; sticky and plastic; clay bridging of sandy grains; a few, patchy clay films in root channels; common gray sand pockets; common, fine and medium roots; mildly alkaline; gradual, wavy boundary.

B22tca—22 to 38 inches, very dark gray (10YR 3/1) sandy clay loam; weak, coarse, subangular blocky structure; sticky and plastic; many, fine to coarse, soft to semihard, white marl nodules; a few, fine roots; calcareous; gradual, wavy boundary.

B23tca—38 to 63 inches, dark-gray (10YR 4/1) sandy clay loam (marl); many, coarse, faint tongues and pockets that are very dark gray (10YR 3/1); a few, fine, distinct, yellowish-brown and strong-brown mottles; many small pockets of grayish-brown (10YR 5/2) fine sand; weak, coarse, subangular blocky structure; sticky and plastic; many, fine and medium nodules of marl; calcareous; gradual, irregular boundary.

Cg—63 to 75 inches +, gray (10YR 5/1) loamy fine sand; many, fine to coarse, faint to distinct, dark grayish-brown (10YR 4/2) mottles; massive; slightly sticky; many medium pockets of gray to white (N 5/0 to 8/0) fine sand and many, fine and medium pockets of very dark gray (10YR 3/1) sandy loam; a few, small, white marl nodules; weakly calcareous.

The A horizon is very dark gray or black and is 6 to 10 inches thick. In this horizon the content of organic matter ranges from 5 to 18 percent. The B21t horizon is very dark gray to black and is 14 to 30 inches thick. It is sticky and plastic when wet and contains streaks and pockets of gray fine sand. Reaction ranges from slightly acid to neutral in the A horizon and from neutral to mildly alkaline in the B21t horizon. The horizons below the B21t horizon range from very dark gray to light gray, are sandy clay loam or fine sandy loam, and contain marl lenses and sand pockets. The water table is above the surface or is at a depth of 0 to 15 inches.

Included with this soil in mapping are small areas of Manatee and Felda soils, which have a coarser textured surface layer than that in this soil. Also included are small areas of a soil that has an organic surface layer more than 12 inches thick.

This soil is slowly permeable and has high available water capacity. Fertility is moderately high, and content of organic matter is high.

Most areas of this soil remain in native vegetation. The vegetation generally is pickerelweed, water lilies, sawgrass,

and scattered shrubby swamp maples, though ash, gum, maple, and cabbage-palms grow in a few areas. A few other areas are used for improved pasture, and the pasture is of high quality. Complete water control is needed for improved pasture or for cultivated crops. Drainage is not feasible, however, in a few small areas because adequate outlets are lacking. Capability unit IIIw–4; Sand Pond range site; woodland group 5.

Delray fine sand (De).—This very poorly drained, nearly level, sandy soil is in depressions and drainageways. It occurs in most parts of the county, especially in areas adjacent to Lake Okeechobee.

In a typical profile the surface layer is slightly acid, black fine sand about 18 inches thick. It has a high content of organic matter. The subsurface layer, about 28 inches thick, is neutral, gray fine sand that has many darker colored streaks and pockets. At a depth of about 46 inches is mildly alkaline, dark grayish-brown fine sandy loam. Below a depth of about 60 inches is grayish-brown loamy fine sand. Areas in depressions are covered by water most of the time. Other areas normally have a water table within a depth of 15 inches.

Typical profile of Delray fine sand (7/8 mile west of U.S. Highway No. 441 and about 2 miles south of the center of Okeechobee):

Ap—0 to 8 inches, black (10YR 2/1) fine sand; weak, coarse, crumb structure; friable; a few, coarse, faint, dark-gray sand pockets; content of organic matter is 5 to 10 percent; many fine roots; slightly acid; clear, smooth boundary.

A12—8 to 18 inches, black (10YR 2/1) fine sand; many, medium and coarse, faint, dark-gray and very dark gray streaks and mottles; weak, fine, crumb structure; very friable; content of organic matter is less than 5 percent; many fine roots; slightly acid; gradual, wavy boundary.

A2—18 to 46 inches, gray (10YR 5/1) fine sand; single grain; loose; common, fine and medium, faint, dark-gray and very dark gray streaks; a few, fine roots; number of roots decrease with depth; neutral; abrupt, wavy boundary.

B2tg—46 to 60 inches, dark grayish-brown (10YR 4/2) fine sandy loam; massive; nonsticky, nonplastic; sand grains are coated and bridged with clay; mildly alkaline; gradual, irregular boundary.

B3g—60 to 75 inches +, grayish-brown (2.5Y 5/2) loamy fine sand; a few, medium, distinct, light olive-brown and brownish-yellow mottles; massive; nonsticky, nonplastic; common pockets of light-gray fine sand and gray to dark-gray fine sandy loam; sand grains are coated and bridged with clay; mildly alkaline.

The A1 horizon is very dark gray to black and is 10 to 24 inches thick. The Ap horizon, and the A11 horizon, where present, have a higher organic-matter content than the A12 horizon. Reaction in the A1 horizon ranges from medium acid to neutral. The A2 horizon is grayish brown to white and contains many darker colored streaks and mottles. This layer is 20 to 36 inches thick and is slightly acid to mildly alkaline. Depth to the B2t horizon is between 40 and 60 inches. This layer is dark grayish-brown to light-gray fine sandy loam or sandy clay loam that is 6 inches or more thick and is mottled in places. In this horizon reaction ranges from slightly acid to mildly alkaline. The water table normally is at a depth between 0 to 15 inches, but it rises above the surface for short periods and forms shallow ponds.

Included with this soil in mapping are small areas of Pompano and Manatee soils. Also included are areas of organic soils and of soils that are similar to this soil but lack a loamy subsoil within a depth of 60 inches. Delray fine sand has a thicker, darker colored surface layer than the Pompano soil and contains more organic matter. It is similar to the Manatee soil but has a loamy subsoil at a depth of 40 inches or more.

Delray fine sand normally is wet, but it is rapidly permeable in the upper 46 inches and moderately permeable below that depth. If drainage outlets are available, this soil can be drained without difficulty. Available water capacity is moderate, especially in the highly organic surface layer. Fertility is moderate, and the content of organic matter is high.

Most areas of this soil are used primarily as native range and are either in grassy sloughs or in intermittent ponds. The vegetation consists chiefly of waxmyrtle, pickerelweed, sedges, reeds, and grasses that tolerate wetness, but cypress, sweetbay, and sweetgum trees grow in places.

This soil is well suited to improved pasture if a drainage system is provided that removes excess surface water. Under good management that includes complete water control, truck crops, sugarcane, and special crops are well suited. Except in areas where deep drainage has been established, this soil is poorly suited to citrus. Crops on this soil respond well if fertilizer is added. Many areas of this soil are best left in native vegetation for use as range and as wildlife habitat. Capability unit IIIw–5; Sand Pond and Slough range sites; woodland group 7.

Delray fine sand, thin solum variant (Dt).—This very poorly drained, nearly level, sandy soil is in broad low areas near Lake Okeechobee.

In a typical profile the surface layer is slightly acid, black fine sand about 12 inches thick that has a high content of organic matter. The subsurface layer is mildly alkaline, grayish-brown fine sand that has darker colored streaks and pockets. This layer is about 19 inches thick. At a depth of about 31 inches is a 4-inch layer of gray fine sandy loam that overlies a thick layer of light-gray fine sandy loam (marl). The water table normally is at a depth of about 15 inches.

Typical profile of Delray fine sand, thin solum variant (in an improved pasture one-fourth mile west of U.S. Highway No. 441 and 2 miles south of the center of Okeechobee):

Ap—0 to 6 inches, black (10YR 2/1) fine sand; moderate, medium, granular structure; friable; content of organic matter is about 15 percent; many fine roots; slightly acid; gradual, wavy boundary.

A12—6 to 12 inches, black (10YR 2/1) fine sand; weak, fine, crumb structure; very friable; many fine roots; mixing of black organic matter and gray fine sand in places; slightly acid; gradual, wavy boundary.

A2—12 to 31 inches, grayish-brown (10YR 5/2) fine sand; single grain; loose; common fine roots; narrow, vertical streaks of dark grayish brown (10YR 4/2) and very dark gray (10YR 3/1); mildly alkaline; clear, wavy boundary.

Btg—31 to 35 inches, gray (10YR 5/1) fine sandy loam; common, medium, distinct, very pale brown (10YR 7/3), strong-brown (7.5YR 5/8), and light brownish-gray (10YR 6/2) mottles; massive when wet, but weak, subangular blocky structure when moist; slightly sticky, slightly plastic; a few, fine roots; a few, fine marl flecks or nodules; sand grains are bridged with clay; moderately alkaline; clear, wavy boundary.

Cca—35 to 48 inches +, light-gray (10YR 6/1) fine sandy loam (marl) that is mixed with shell fragments; massive; friable, slightly sticky; calcareous.

The Ap horizon is black fine sand and has 5 to 18 percent organic matter. The A12 horizon is very dark gray to black fine sand. Thickness of these two horizons ranges from 10 to 24 inches. The A2 horizon is dark gray to light gray and has grayish-brown to black vertical streaks and pockets. This horizon is 12 to 24 inches thick. Depth to the mottled, grayish- to brownish-colored Bt horizon is 30 to 40 inches. It is 2 to 8 inches thick, and in some places it has pockets or lenses of sandier material. This layer overlies marl, shell, sand, or limerock. The reaction in all horizons above the Cca horizon (marl) ranges from slightly acid to moderately alkaline. Except where it is artificially drained, this soil has a water table at a depth of 0 to 15 inches for a period of 2 to 6 months each year.

Included with this soil in mapping are small areas of the Delray, Manatee, and Okeelanta soils. Also included are small areas of soils that are similar to Delray fine sand, thin solum variant, but have limerock at a depth of less than 30 inches and spots where rocks crop out. Delray fine sand, thin solum variant, is not so deep to loamy material as Delray fine sand. Its subsoil is not so thick as that of the Manatee soil, and it lacks the thick surface layer of peat common in the Okeelanta soil.

Delray fine sand, thin solum variant, normally has a water table at a shallow depth. It typically is rapidly permeable, however, in the upper 30 inches and moderately permeable below that depth and can be drained with little difficulty. Available water capacity is moderate, especially in the surface layer. Fertility is moderate, and content of organic matter is high.

On this soil the native vegetation consists of waxmyrtle, pickerelweed, sedges, reeds, and grasses that tolerate wetness. Most areas have been drained and are used for improved pasture, to which they are well suited. Under good management that includes complete water control, this soil is also well suited to sugarcane and to truck and special crops. Except where deep drainage has been established, this soil is poorly suited to citrus. Crops on this soil respond well if fertilizer is applied. Capability unit IIIw–5; Slough range site; woodland group 7.

Elred fine sand (Ef).—This poorly drained, nearly level, sandy soil is in low flatwoods and grassy sloughs. It occurs in many parts of the county in small areas.

In a typical profile the surface layer is slightly acid to neutral, very dark gray and dark grayish-brown fine sand about 12 inches thick. The subsurface layer is neutral, brown and pale-brown fine sand about 12 inches thick. Below is a bright-colored layer of neutral brownish-yellow fine sand. Beginning at a depth of 36 inches is mildly alkaline, dark-gray fine sandy loam. Below a depth of 48 inches is mildly alkaline, light brownish-gray fine sand. The water table normally is at a depth of about 20 inches.

Typical profile of Elred fine sand (about one mile north of the headquarters of the Griffith Ranch and 3 miles north of Eagle Island Road):

A11—0 to 5 inches, very dark gray (10YR 3/1) fine sand; weak, fine, crumb structure; friable; many fine roots; has a salt-and-pepper appearance in places because of mixing of organic matter and light-gray sand; slightly acid; clear, smooth boundary.

A12—5 to 12 inches, dark grayish-brown (10YR 4/2) fine sand; single grain; loose; many medium and coarse roots; neutral; gradual, smooth boundary.

A21—12 to 18 inches, brown (10YR 5/3) fine sand; common, coarse, distinct, yellowish-brown (10YR 5/6) mottles; single grain; loose; a few medium roots; neutral; gradual, wavy boundary.

A22—18 to 24 inches, pale-brown (10YR 6/3) fine sand; many, medium and coarse, distinct, brownish-yellow (10YR 6/6) and yellowish-brown (10YR 5/6) mottles; single grain; loose; a few medium roots; neutral; gradual, wavy boundary.

Bir—24 to 36 inches, brownish-yellow (10YR 6/6) fine sand; many, medium, faint, yellow mottles; single grain; loose, nonsticky; a few, clean sand grains; neutral; clear, wavy boundary.

Btg—36 to 48 inches, dark-gray (10YR 4/1) fine sandy loam; many, fine to coarse, distinct, dark grayish-brown (10YR 4/2) and yellowish-brown (10YR 5/6) mottles; massive when wet, weak, subangular blocky structure when moist; slightly sticky; mildly alkaline; clear, wavy boundary.

C—48 to 66 inches, light brownish-gray (10YR 6/2) fine sand; common, coarse, faint, grayish-brown and brown splotches; single grain; nonsticky; mildly alkaline.

The A11 horizon is dark gray to black and is 2 to 6 inches thick. The A12 and A2 horizons range from dark grayish brown to light gray, brown, and pale brown, and together are 10 to 24 inches thick. One or more of these horizons may be absent in some areas. Depth to the Bir horizon is 12 to 30 inches. This horizon ranges from yellowish brown to brownish yellow and is 6 to 24 inches thick. Reaction in these sandy layers ranges from medium acid to mildly alkaline. The Bt horizon is mottled, light-gray to dark-gray sandy loam to sandy clay loam. This horizon is 6 to 24 inches thick and ranges from slightly acid to mildly alkaline. Depth to the water table ranges from near the surface for a period of 1 to 2 months during the wet season to about 30 inches during the dry season.

Included with Elred fine sand in mapping are small areas of Felda, Pompano, Charlotte, and Wabasso soils. Elred fine sand has a brownish-yellow horizon, which the Felda soils lack. It has a sandy loam subsoil which is lacking in the Pompano and Charlotte soils. It is similar to Bradenton and Wabasso soils, but it lacks the marl substratum below a loamy layer, typical of the Bradenton soil, and lacks the organic pan above a loamy layer, typical of the Wabasso soil.

Although Elred fine sand is seasonally wet, it is moderately to rapidly permeable and responds well to simple drainage practices. Available water capacity is low in the sandy surface layer, but it is high in the loamy subsoil. Fertility is moderately low, and content of organic matter is low.

Most areas of this soil remain in native vegetation. The plant cover generally is scattered pines and cabbage-palms that have an understory of saw-palmettos and native grasses. Some areas, however, are treeless, grassy sloughs that are used chiefly for native range.

Under good management native grasses on this soil provide good grazing. This soil is well suited to improved pasture if a simple drainage system is provided that removes excess water. If complete water control is provided and other good management is used, this soil is well suited to citrus and to special truck crops. Crops on this soil respond well to fertilizer. Capability unit IIIw–4; Slough range site; woodland group 7.

Felda fine sand (Ff).—This poorly drained, nearly level, sandy soil is in depressions and grassy sloughs in many parts of the county.

In a typical profile the surface layer is strongly acid, black fine sand about 4 inches thick. The subsurface layer is slightly acid, grayish-brown and light-gray fine sand about 18 inches thick. The subsoil, about 20 inches thick, consists of neutral to mildly alkaline, mottled gray fine sandy loam in the upper part and mildly alkaline, dark-gray loamy fine sand in the lower part. The underlying material, to a depth of 60 inches or more, is white fine sand. The water table normally is at a depth of 20 inches, but a few small areas are covered by water most of the year.

Typical profile of Felda fine sand (about 1 mile north of Basinger in a slough just south of the road entering the Emenargee Ranch):

A1—0 to 4 inches, black (10YR 2/1) fine sand; weak, fine, crumb structure; friable; many fine and medium roots; in places has a salt-and-pepper appearance because of mixing of black organic matter and light-gray sand; strongly acid; clear, wavy boundary.

A21—4 to 8 inches, grayish-brown (10YR 5/2) fine sand; many, fine, faint, dark-gray, very dark gray, and brown streaks and mottles; single grain; loose; many fine roots; slightly acid; clear, wavy boundary.

A22—8 to 22 inches, light-gray (10YR 7/2) fine sand; single grain; loose; a few fine and medium roots; slightly acid; clear, smooth boundary.

B2tg—22 to 32 inches, gray (10YR 5/1) fine sandy loam; many, medium and coarse, yellowish-red (5YR 5/8)

and brownish-yellow (10YR 6/8) mottles; massive when wet but weak, coarse, subangular blocky structure when moist; friable, slightly sticky and slightly plastic when wet; a few fine roots; some clay bridging between sand grains; a few patchy clay films on ped faces; a few medium root channels; neutral; clear, irregular boundary.

B3g—32 to 42 inches, dark-gray (N 4/0) loamy fine sand; a few, coarse, distinct, brown (10YR 4/3) mottles; single grain; nonsticky; many pockets and discontinuous lenses of fine sandy loam; mildly alkaline; clear, wavy boundary.

Cg—42 to 60 inches +, white (N 8/0) fine sand; single grain; nonsticky; thin lenses and small pockets of gray fine sandy loam; mildly alkaline.

The A1 horizon is strongly acid to slightly acid, is gray to black, and is 2 to 12 inches thick. If this horizon is black or very dark gray, it generally is less than 6 inches thick. The A2 horizon is slightly acid to neutral. The A21 horizon is dark gray to grayish brown and is 3 to 8 inches thick. The A22 horizon is gray to white or pale brown and is 14 to 26 inches thick. Depth to the B2tg horizon is 20 to 36 inches. This horizon is mottled and is mainly fine sandy loam, but it contains sandy pockets and lenses. It is neutral to mildly alkaline and 6 to 24 inches thick. The water table is at a depth of 0 to 15 inches for short periods in the wet seasons but may drop to 40 inches in a prolonged dry season.

Included with this soil in mapping are small areas of Pompano, Delray, Elred, and Manatee soils. This soil has a loamy subsoil, which is lacking in the Pompano soil. It has a thinner A1 horizon than that in the Delray and Manatee soils. It is similar to the Elred soil, but it is grayer than that soil.

Although Felda fine sand is wet most of the time, it is moderately to rapidly permeable and responds readily to drainage. The available water capacity is low in the sandy surface layer, but it is high in the loamy subsoil. Fertility is moderately low, and content of organic matter is low.

Many areas of this soil remain in native vegetation typical of grassy sloughs. Few good drainage outlets are available, and the areas are used chiefly for native range and as wildlife habitat. Where drainage is feasible, this soil is well suited to improved pasture. Under good management that includes complete water control, this soil is well suited to citrus and to adapted cultivated crops. Crops on this soil respond well if fertilizer is applied. Capability unit IIIw-4; Slough range site; woodland group 7.

Felda, Pompano, and Placid soils, ponded (Fp).—This undifferentiated unit consists of nearly level, sandy soils that are very poorly drained. These soils occur throughout the county in depressions that are covered by water most of each year. One or more of the named soils is dominant in any mapped area, but these three soils rarely are together in one mapped area. Where soils are overlying neutral to calcareous material, the Felda and Pompano soils are dominant. Where areas of acid soils occur, the Placid soil is dominant. A typical profile of each of these soils is described in the mapping units Felda fine sand, Pomano fine sand, and Placid fine sand.

Included in mapping with this unit where Felda and Pompano soils are dominant are small areas of such soils as the Charlotte, Delray, and Manatee. The Felda and Pompano soils lack the bright-colored sandy layer that occurs at a depth between 8 and 30 inches in the Charlotte soil, and they lack the thicker black surface layer common in the Delray and Manatee soils.

Where the Placid soil is dominant, areas of the Basinger soil are included with this unit in mapping. The Placid soil has a thicker, dark-colored surface layer (A1 horizon) than that in the Basinger soil. Also included with this mapping unit and occurring throughout the entire unit are small areas of organic soils in deep pockets.

Drainage and complete water control measures are needed before these soils can be used for farm crops. Simple surface drainage and fertilization are needed for improved pastures. Before these soils can be cultivated safely, they require a water management plan that is carefully designed and intensively applied. Many areas of this unit are small and are far from drainage outlets. Development of such areas for crops generally is not feasible.

The native vegetation on these soils consists mainly of maidencane, pickerelweed, St. Johnswort, and other aquatic plants. Many areas probably should be kept in their native state and used as ponds for watering livestock and as feeding grounds for water fowl. Capability unit IIIw-4; Sand Pond range site; woodland group 7.

Ft. Drum fine sand (Fr).—This somewhat poorly drained, nearly level soil is in flatwoods and hammock areas that border sloughs and depressions. The areas are small and occur in many parts of the county.

In a typical profile the surface layer is fine sand about 17 inches thick. It is strongly acid and very dark gray to dark gray in the upper part and brown, slightly acid, and mottled in the lower part. The subsoil is calcareous, white fine sandy loam about 8 inches thick. The next layer is neutral, brownish-yellow fine sand about 13 inches thick. Grayish-brown and gray fine sand extends below this to a depth of 70 inches or more. The water table is at a depth of about 30 inches.

Typical profile of Ft. Drum fine sand (200 feet west of Jim Durrance Road, 1/4 mile south of Eagle Island Road and about 5 1/2 miles northeast of Basinger):

A11—0 to 3 inches, very dark gray (10YR 3/1) fine sand; weak, fine, crumb structure; very friable, nonsticky; common fine and medium roots; many, clean, light-gray sand grains; strongly acid; gradual, smooth boundary.

A12—3 to 5 inches, dark-gray (10YR 4/1) fine sand; single grain; loose, nonsticky; common fine and medium roots; common, clean sand grains; strongly acid; gradual, wavy boundary.

A13—5 to 17 inches, brown (10YR 4/3) fine sand; a few, fine, faint, yellowish-brown mottles and common, medium, faint, very pale brown mottles; single grain; loose, nonsticky; a few, fine and medium roots; slightly acid; abrupt, wavy boundary.

Bca—17 to 25 inches, white (N 8/0) fine sandy loam (marl); common, fine and medium, distinct, brownish-yellow (10YR 6/6) and yellow (10YR 8/6) mottles; weak subangular blocky structure that breaks to moderate, fine, granular; friable; common medium and coarse roots; calcareous; gradual, smooth boundary.

C1—25 to 38 inches, brownish-yellow (10YR 6/6) fine sand; many, coarse, distinct, yellowish-brown (10YR 5/6) mottles; a few, coarse, distinct, light-gray (10YR 7/2) and very pale brown (10YR 7/3) mottles; and a few, coarse, distinct, yellowish-brown (10YR 5/8) mottles; single grain; loose; a few roots; neutral; gradual, wavy boundary.

C2—38 to 56 inches, grayish-brown (2.5Y 5/2) fine sand; many, medium, distinct, dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/6) mottles; single grain; loose, nonsticky; slightly acid; gradual, wavy boundary.

C3—56 to 70 inches +, gray (5Y 6/1) fine sand; single grain; loose, nonsticky; a few, fine, marl nodules; mildly alkaline.

The A11 horizon ranges from gray to very dark gray and is 2 to 6 inches thick. Reaction in this layer is medium acid to strongly acid. The A12 horizon is light gray to dark gray and is 2 to 6 inches thick. The A13 horizon is dark grayish brown to pale brown or yellowish brown. It is slightly acid to neutral and is 8 to 14 inches thick. The Bca horizon is at a depth of 12 to 20 inches. It ranges from yellowish brown to white in color and from fine sandy loam to loamy fine sand in texture. This layer is 6 to 15 inches thick and is highly calcareous. Below are layers of slightly acid to mildly alkaline, grayish to yellowish fine sand. Depth to the water table ranges from near the surface for short periods in the wet season to 48 inches or more in an extended dry season.

Included with this soil in mapping are small areas of the Charlotte, Pompano, Myakka, and Immokalee soils. Ft. Drum fine sand is not so poorly drained as the Charlotte and Pompano soils and has a calcareous loamy subsoil that these soils lack. It is less acid throughout than the Myakka and Immokalee soils and lacks the well-developed organic pan typical of these soils.

The sandy surface layer in this soil is rapidly permeable, and the loamy marl layer is moderately to rapidly permeable. Although it is periodically wet, this soil is droughty during dry periods because its available water capacity is very low. Fertility and content of organic matter are low.

Most areas of this soil remain in native vegetation that consists of an open growth of pine trees and scattered cabbage-palms that have an understory of saw-palmettos and native grasses. A few small areas consist of palm hammocks that are used chiefly for native range. This soil is suited to improved pasture if simple surface drainage is provided. The hammock areas provide shelter and limited browse for wildlife. Under good management and proper water control that includes drainage and irrigation, this soil is suited to citrus and a few special crops. Capability unit IVw-1; Sweet Flatwoods range site and Hammock range site; woodland group 2.

Immokalee fine sand (Im).—This deep, poorly drained, nearly level, sandy soil is in broad flatwoods areas in all parts of the county.

In a typical profile the surface layer is very strongly acid, very dark gray fine sand about 6 inches thick. The subsurface layer is light-gray to white fine sand about 29 inches thick. An organic pan layer, about 20 inches thick, is at a depth of about 35 inches. The upper part of this pan is weakly cemented, black fine sand, and the lower part is mottled dark reddish-brown fine sand. Below is strongly acid, brown fine sand. The water table normally is at a depth of about 30 inches.

Typical profile of Immokalee fine sand (along Spicy Island Road, 300 feet west of U.S. Highway No. 441, and about 7½ miles north of the center of Okeechobee):

A1—0 to 6 inches, very dark gray (10YR 3/1) fine sand; weak, fine, crumb structure; very friable; many fine and medium roots; has a salt-and-pepper appearance in places because of mixing of organic matter and light-gray sand; very strongly acid; clear, smooth boundary.

A21—6 to 12 inches, light-gray (10YR 6/1) fine sand; many, coarse, faint, gray mottles and a few, coarse, distinct, dark-gray mottles; single grain; loose; common, fine, medium roots; very strongly acid; gradual, wavy boundary.

A22—12 to 35 inches, white (10YR 8/1) fine sand; single grain; loose; a few, fine, very dark gray streaks in root channels; a few, fine, medium and coarse roots; very strongly acid; ½ to 1 inch transitional layer that has a wavy boundary.

B21h—35 to 43 inches, black (10YR 2/1) fine sand; massive in place, but crushes to weak, fine, crumb structure; firm and weakly cemented, but friable when crushed; lower 2 inches grades to dark reddish brown (5YR 2/2); common fine and medium roots; very strongly acid; clear, wavy boundary.

B22h—43 to 54 inches, dark reddish-brown (5YR 3/3) fine sand; single grain; loose; common, fine and medium, dark reddish-brown (5YR 2/2) mottles; weakly cemented; a few, fine and medium roots; strongly acid; gradual, wavy boundary.

C—54 to 72 inches +, brown (10YR 4/3) fine sand; a few, fine, faint, light-gray, dark-brown, and pale-brown mottles; single grain; loose; strongly acid.

This soil is fine sand to a depth of 72 inches or more, and in all layers the reaction is strongly acid to very strongly acid. The A1 horizon is gray to black and 2 to 8 inches thick. The A2 horizon is light gray to white and 22 to 40 inches thick. The organic pan (B21h horizon) occurs at a depth between 30 and 48 inches and commonly consists of two parts. The upper part is black to dark reddish brown, is weakly cemented, and ranges from about 2 to 10 inches in thickness. The lower part is very dark brown to dark reddish brown and is mottled. It generally is thicker and less cemented than the upper part. Brownish- to grayish-colored layers occur below the pan. During the wet season the water table rises to near the surface for short periods, but it recedes to a depth of 48 inches or more during the dry season.

Included with this soil in mapping are small areas of Myakka, Pomello, St. Johns, Basinger, and Placid soils. This soil is similar to the Myakka soil, but depth to the organic pan is greater. It is not so well drained as the Pomello soil. Its surface layer (A1 horizon) is thinner than that in the St. Johns soil, and depth to the organic pan is greater. Unlike the Basinger and Placid soils, Immokalee fine sand has an organic pan.

Although Immokalee fine sand is periodically wet, it is rapidly permeable and responds readily to simple drainage practices. It is droughty during dry periods because its available water capacity is low. Fertility and content of organic matter are low.

Most areas of this soil remain in the native flatwoods and are used for range. The vegetation consists chiefly of saw-palmettos and grasses but includes scattered pines. Many areas are in improved pastures of high quality. Such crops as tomatoes and watermelons are grown on a small acreage under a high level of management that includes complete water control. This soil is poorly suited to citrus. Capability unit IVw-2; Acid Flatwoods range site; woodland group 4.

Made land (Ma).—This land type consists of sandy material and of several other kinds of soil and geologic materials, including shells, that have been reworked by soil-moving equipment. The areas have been built up above wet ground by using soil material that was brought in by truck or by dredging. Smoothing and leveling have made the areas suitable for use as building sites, highways, recreational areas, or for other purposes. Made land occurs primarily in or near the city of Okeechobee.

The Florida School for Boys and the Okeechobee County Airport occupy large areas of Made land. Also, much of the subdivision on the eastern side of Taylor Creek is built on spoil material removed from Taylor Creek during channel excavation. In other parts of the county, small areas of Made land consist of spoil material that has been spread over soils adjacent to Borrow pits.

Because of the wide range of soil characteristics, most of them unfavorable, this land type is generally not suited to cultivated crops. If smoothed and managed properly, a few small areas scattered throughout the county can be used for improved pasture. Most areas, however, are used for urban construction. Not placed in a capability unit, range site, or woodland group.

Manatee loamy fine sand (Mc).—This very poorly drained, nearly level soil is in shallow depressions in many parts of the county.

In a typical profile the surface layer is neutral, black loamy fine sand about 18 inches thick. The subsoil is fine

sandy loam about 30 inches thick. It is mildly alkaline and very dark grayish brown in the upper part, dark gray with brownish-colored mottles in the middle part, and calcareous and dark gray with many specks of white marl in the lower part. Below is light-gray fine sandy loam. Most of the year the water table is within a depth of 0 to 15 inches. For periods of more than 6 months each year this soil normally is ponded.

Typical profile of Manatee loamy fine sand (on the Williamson Ranch, 1 mile east of U.S. Highway No. 441 and about 6 miles north of the center of Okeechobee):

Ap—0 to 12 inches, black (10YR 2/1) loamy fine sand; moderate, medium, granular structure; friable; many fine and medium roots; content of organic matter is 10 to 15 percent; neutral; gradual, wavy boundary.

A12—12 to 18 inches, black (10YR 2/1) loamy fine sand; weak, fine, granular structure; friable; many fine and medium roots; many granules of mucky fine sand; neutral; gradual, wavy boundary.

B21t—18 to 24 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; a few, thin, light-gray (10YR 7/1) streaks and small pockets of sand; weak, coarse, subangular blocky structure that breaks to moderate, medium, granular; friable, nonplastic; many fine and a few medium roots; mildly alkaline; clear, wavy boundary.

B22tg—24 to 36 inches, dark-gray (10YR 4/1) fine sandy loam; a few, fine, faint, brown and olive-brown mottles; weak, coarse, subangular blocky structure; friable, nonplastic; common fine and medium roots; mildly alkaline; gradual, wavy boundary.

B3cag—36 to 48 inches, dark-gray (10YR 4/1) fine sandy loam; many, medium, faint, grayish-brown (10YR 5/2) mottles; weak, medium, subangular blocky structure; friable; slightly sticky, slightly plastic; common fine and medium roots in upper part of horizon; many, fine, soft and semihard white carbonate nodules; calcareous; gradual, wavy boundary.

Ccag—48 to 60 inches +, light-gray (5Y 6/1) fine sandy loam; common, coarse, distinct, greenish-gray (5G 5/1) and bluish-gray (5B 6/1) mottles; massive; slightly plastic, slightly sticky; many, soft white, carbonate nodules; calcareous.

The A horizon is 10 to 20 inches thick, is 5 to 18 percent organic matter in the upper part, and ranges from slightly acid to mildly alkaline. A thin layer of peat or muck is at the surface in some areas. The B2 horizon is neutral to mildly alkaline fine sandy loam and contains small sand pockets in places. This layer is 10 to 34 inches thick and ranges from very dark grayish brown to gray in color and has some mottles. At a depth between 24 and 40 inches is the B3ca horizon, a marly fine sandy loam or loamy fine sand. This layer is calcareous, is gray to dark gray, and contains many nodules of white marl. Layers of shelly material occur below a depth of 40 inches in some areas. The water table is either above the surface or is within a depth of 15 inches.

Included with this soil in mapping are small areas of the Chobee, Delray, and Felda soils. Also included are small areas of similar soils that lack a calcareous subsoil and spots of a soil that has an organic surface layer. Manatee loamy fine sand has a fine sandy loam subsoil, which is at a depth of more than 40 inches in the Delray soil. It has a thicker dark-colored surface layer (A1 horizon) than that in the Felda soil. The Chobee soil has a sandy clay loam subsoil within a depth of 20 inches.

Manatee loamy fine sand is rapidly permeable in the surface layer and moderately permeable in the subsoil. Available water capacity is high. Fertility and content of organic matter also are high.

Most areas of this soil remain in native vegetation. The vegetation generally is maidencane, sedges, and other plants that tolerate wetness, but cypress and other wetland hardwoods grow in some places. The treeless marsh areas make good native range.

This soil is well suited to improved pasture if a drainage system is provided that removes excess water rapidly. Under good management that includes a properly designed and installed water control system, some of the larger areas are well suited to cultivated crops and to citrus. Capability unit IIIw-4, Sand Pond range site; woodland group 5.

Manatee, Delray, and Okeelanta soils (Mo).—This undifferentiated unit consists of nearly level soils that are very poorly drained. These soils are on marshy flood plains of the Kissimmee River and of Taylor Creek. Most areas are inaccessible because of wetness, dense vegetation, and old stream channels. The areas of this unit were dry enough, however, to determine the dominant soils. A typical profile of each dominant soil is described under the mapping units Manatee loamy fine sand, Delray fine sand, and Okeelanta peat.

Included with this unit in mapping are small areas of the Chobee and Felda soils and ponded areas of the Pompano soil. Also included are soils similar to Okeelanta peat, but that have a surface layer of organic material that is more than 36 inches thick.

The soils in this unit have a thicker surface layer (A1 horizon) than the Felda and Pompano soils. They lack the sandy clay loam subsoil common in the Chobee soil.

Most of these soils remain in native marsh vegetation that consists of a dense growth of pickerelweed, iris, smartweed, maidencane, black willow, and other aquatic shrubs and grasses. These areas are well suited to use as native range and as wildlife habitat. Major structures to control flooding have been installed on both the Kissimmee River and Taylor Creek. Some areas of these soils now protected from flooding can be used for improved pasture and for cultivated crops.

Drainage and continual water management are needed if these soils are used for any farm crop. Simple surface drainage is needed if the areas are used for improved pasture. Under management that includes a system for water control that is carefully designed and is properly applied, these soils are well suited to truck and special crops. Many areas should be kept in their native state and used as wildlife habitat and as nesting and feeding grounds for waterfowl. Capability unit IIIw-4; Fresh Marsh range site; woodland group 5.

Myakka fine sand (My).—This deep, poorly drained, nearly level, sandy soil is in broad flatwood areas throughout the county.

In a typical profile the surface layer is very strongly acid, dark-gray fine sand about 6 inches thick. The subsurface layer is light-gray fine sand about 18 inches thick. At a depth of about 24 inches is a well-developed organic pan. This pan is very strongly acid, weakly cemented, dark reddish-brown fine sand about 6 inches thick. Just below is a layer of dark-brown fine sand about 10 inches thick. The underlying material consists of layers of pale-brown and light brownish-gray fine sand that extend to a depth of more than 66 inches. The water table normally is at a depth of about 30 inches.

Typical profile of Myakka fine sand (about two-thirds mile west of U.S. Highway No. 441 and 1 mile southwest of Fort Drum):

A1—0 to 6 inches, dark-gray (10YR 4/1) fine sand; weak, fine, crumb structure; very friable; has a salt-and-pepper appearance in places because of mixing of organic matter and light-gray sand; many fine and medium roots; very strongly acid; gradual, smooth boundary.

A2—6 to 24 inches, light-gray (10YR 6/1) fine sand; single grain (structureless); loose; a few vertical streaks of dark-gray (10YR 4/1) fine sand; common coarse pockets of light-gray (10YR 7/1) and white (10YR 8/1) fine sand; common, fine, medium, and coarse roots; very strongly acid; ½ to 1 inch transitional layer that has a wavy boundary.

B2h—24 to 30 inches, dark reddish-brown (5YR 2/2) fine sand; a few, medium, distinct, brown (7.5YR 4/4) mottles and streaks of black (10YR 2/1); massive, but crushes to weak, fine, crumb structure; friable; weakly cemented; a few fine pockets of gray fine sand; many fine and medium roots and a few coarse roots; very strongly acid; clear, wavy boundary.

B3—30 to 40 inches, dark-brown (7.5YR 4/4) fine sand; medium, coarse, distinct, dark-brown mottles; single grain; loose; many fine and medium roots and a few coarse roots; very strongly acid; clear, wavy boundary.

C1—40 to 56 inches, pale-brown (10YR 6/3) fine sand; a few, medium, faint, dark grayish-brown and brown mottles; single grain; loose; a few fine roots; strongly acid; gradual, wavy boundary.

C2—56 to 66 inches +, light brownish-gray (10YR 6/2) fine sand; common, fine and medium, faint mottles of dark gray, light gray, and white; single grain; loose; strongly acid.

This soil is fine sand to a depth of 72 inches or more, and it is very strongly acid to strongly acid throughout. The A1 horizon is gray to black and is 2 to 8 inches thick. The A2 horizon is gray to white and is 2 to 24 inches thick. Depth to the organic pan (B2h horizon) ranges from 10 to 30 inches. The upper boundary of the pan may be uniformly smooth or may be irregular and have tongues and pockets of light-colored sand from the A2 horizon (fig. 4). The pan is black to dark reddish brown, is 6 to 18 inches thick, and is weakly cemented by organic matter. The B3 horizon ranges from dark brown to reddish brown. The water table fluctuates from a depth of 0 to 15 inches for 1 to 2 months during the wet season. It drops to a depth of 48 inches or more in the dry season.

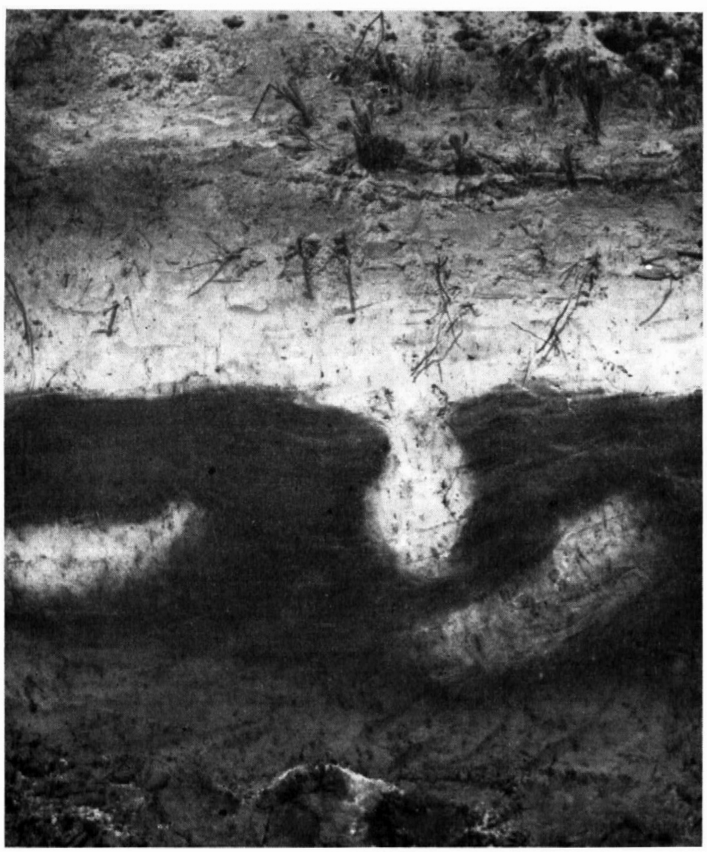

***Figure 4.*—A drainage ditch dug through large areas of Myakka fine sand and showing an organic pan (black area) that is often highly irregular and has many tongues and pockets of white sand from the subsurface layer.**

Included with this soil in mapping are small areas of Basinger, Placid, Immokalee, Pomello, and St. Johns soils. Myakka fine sand has an organic pan, which is lacking in the Basinger and Placid soils. Depth to this pan is less than in the Immokalee soil. This soil has poorer drainage and is less droughty than the Pomello soil. It has a thinner surface layer than the St. Johns soil.

Although Myakka fine sand is periodically wet, it is rapidly permeable and responds readily to simple drainage practices. This soil is droughty during dry seasons, and available water capacity is low. Fertility and content of organic matter are low.

Most areas of this soil remain in native pine trees that have an undergrowth of saw-palmettos, runner oak, gallberry, and many kinds of native grasses. The pine trees have been cleared from many areas and the remaining understory used as range. Many other areas are in improved pasture of high quality. A small acreage is used for tomatoes and watermelons each year, and some areas are suited to citrus. These crops require a high level of management that includes complete water control. Capability unit IVw-2; Acid Flatwoods range site; woodland group 4.

Okeelanta peat (Oe).—This very poorly drained, nearly level, organic soil is in depressions and broad marshes. The areas occur in all parts of the county.

In a typical profile the upper 3 inches is slightly acid, black, granular peat. The next layer, to a depth of about 24 inches, is slightly acid, very dark brown, fibrous peat that contains pockets and lenses of black muck. Below is a 4-inch layer of similar material that contains lenses of peat and much sand. Neutral gray sand occurs below the organic layers. The water table is near or above the surface at all times.

Typical profile of Okeelanta peat (on the Williamson Ranch about 4 miles northeast of the center of Okeechobee and 2½ miles east of U.S. Highway No. 441):

1—0 to 3 inches, black (10YR 2/1) peat; moderate, medium, granular structure; friable; coatings of colloidal organic matter on all ped faces; small amount of gray sand washed into the surface; many fine roots; slightly acid; clear, wavy boundary.

2—3 to 24 inches, very dark brown (10YR 2/2) fibrous peat; weak, coarse, subangular blocky structure; coatings of colloidal organic matter on many ped faces, especially in the upper half of the horizon; has a soft, smooth feel; common, coarse pockets and lenses of black muck; many fine roots; slightly acid; gradual, smooth boundary.

3—24 to 28 inches, very dark brown (10YR 2/2) fibrous peat; massive; many balls or lenses of dark-brown (10YR 3/3) and dark reddish-brown (5YR 3/3) peat; contains little or no colloidal peat; up to 50 percent sand in pockets or mixed into the horizon; many fine roots; slightly acid; gradual, smooth boundary.

Cb—28 to 48 inches +, gray (10YR 5/1) sand; many, coarse, faint, light-gray (10YR 6/1) mottles and a few, coarse, faint, dark-gray (10YR 4/1) mottles; single grain; a few balls of gray loamy fine sand; many fine roots in upper 5 inches; neutral.

This soil has 12 to 36 inches of slightly acid to neutral organic material, mostly peat, overlying neutral sand. The surface layer is black to very dark brown peat or muck and is 3 to 12 inches thick. The next layer is very dark brown to dark reddish-brown fibrous peat and is 12 to 30 inches thick. This layer has pockets and lenses of black muck. Below this is a thin layer of similar organic material that has a high content of sand. The underlying sand commonly has a thin, dark-colored upper part and a thick, grayish-colored lower part.

Included with this soil in mapping are small areas of Terra Ceia, Delray, and Manatee soils.

Okeelanta peat is similar to the Terra Ceia soil but lacks the thick layer of muck common in the Terra Ceia soil and is shallower to underlying sand. It has a thick organic surface layer, which is lacking in the Delray and Manatee soils.

This soil is covered with water most of the time. Drainage outlets generally are far away and small areas therefore are not feasible to drain. Where drainage is feasible, the larger areas can be drained and cultivated. After this soil is reclaimed, subsidence through oxidation is a continuous hazard.

Most areas of this soil remain in native vegetation that consists of sawgrass, lilies, sedges, reeds, a few scattered cypress trees, and other aquatic plants. The areas are used for native range and as wildlife habitat. This soil is well suited to improved pasture if a drainage system is provided that removes excess surface water rapidly. Under management that includes intensive water control, this soil is well suited to special truck crops. Citrus is not suited. Capability unit IIIw-6; Everglades Marsh range site; woodland group 8.

Pamlico muck (Pa).—This very strongly acid, nearly level, organic soil is very poorly drained. It is in depressions, marshes, and swamps, mainly in the eastern half of the county.

In a typical profile the surface layer commonly is a thin layer of loose black muck that contains masses of living and dead roots and partly decomposed plants. The next layer is compact black muck about 24 inches thick that has a smooth, slick feel. In this layer are a few pockets or lenses of dark-brown fibrous peat. At a depth of about 30 inches is a layer of very strongly acid, black sand that overlies dark-gray sand which extends to a depth of more than 60 inches. A few inches of water cover this soil most of the time.

Typical profile of Pamlico muck (at the southern tip of a swampy area, two-thirds of a mile southwest of the headquarters of Dark Hammock Ranch, and about 9½ miles northeast of the center of Okeechobee):

1—0 to 6 inches, black (10YR 2/1) muck; loose mass of living and dead roots and of partly decomposed plant remains and well-decomposed organic material; smooth and slick when crushed; pockets or lenses of very dark brown (10YR 2/2) fibrous peat; very strongly acid; clear, smooth boundary.

2—6 to 30 inches, black (10YR 2/1) muck; massive when wet, weak, coarse, subangular blocky structure when moist; weak vertical and horizontal cleavage; ped faces coated with colloidal organic matter; compact; smooth, slick feel; a few lenses and small pockets of dark-brown (10YR 2/2) fibrous peat; many fine roots; very strongly acid; gradual, irregular boundary.

Ab—30 to 42 inches, black (10YR 2/1) sand; single grain; loose; tongues and pockets of black muck in upper 6 inches; common pockets and streaks of very dark gray sand; lower few inches of horizon grades to very dark gray sand; a few, fine roots; very strongly acid; gradual, smooth boundary.

C—42 to 60 inches +, dark-gray (10YR 4/1) sand; single grain; loose; horizon grades to gray (10YR 5/1) with depth; very strongly acid.

This soil has 12 to 36 inches of strongly acid to extremely acid, well-decomposed, organic material over sand. The surface layer is black to dark-brown muck or peat 4 to 12 inches thick. Below is a dense layer of black to very dark brown muck that contains some pockets or lenses of brownish-colored, fibrous peat. This layer ranges from 12 to 30 inches in thickness, but it is seldom less than 18 inches thick. At a depth of less than 36 inches is a layer of black to very dark gray sand that is 2 to 12 inches thick. The content of organic matter in this layer ranges from 1 to 10 percent. Dark-gray to light-gray sand is at a depth between 42 and 60 inches or more. The water table drops a few inches below the surface for short periods during an unusually dry season.

Included with this soil in mapping are small areas of soils that consist of peaty material instead of muck and soils that have layers of muck extending to a depth of more than 36 inches. Also included are small areas of the Placid soil, which lack the thick organic surface layer of the Pamlico soils.

The content of nitrogen is high, but the content of other plant nutrients is low. Available water capacity is high. Because this soil occupies lowest areas in the landscape, drainage outlets generally are far away. If outlets are available, this soil can be drained and used for improved pasture and cultivated crops. After the soil is reclaimed, subsidence through oxidation is a continuous hazard.

Most areas of this soil have a dense cover of native vegetation made up of sweetbay, sweetgum, cypress, ferns, sawgrass, and other aquatic plants. The areas are used primarily for native range and as habitat for wildlife. If the trees are removed and a drainage system that removes excess surface water is provided, the areas can be used for improved pasture of high quality. Under a high level of management that includes complete water control, this soil is well suited to special truck crops. Citrus is not suited. Large amounts of lime and fertilizer are needed for pastures and cultivated crops. Capability unit IIIw-6; Swamp range site; woodland group 8.

Paola fine sand (Pd).—This moderately well drained, deep, nearly level, sandy soil is on low knolls and ridges. It occurs primarily in the northern part of the county near Fort Drum. The areas are slightly elevated and are a few hundred acres each in size.

In a typical profile the surface layer is dark-gray fine sand about 4 inches thick. The subsurface layer is light gray and is about 8 inches thick. Just below is a dark reddish-brown layer that contains a few darker colored, weakly cemented lumps of fine sand. At a depth below 14 inches are layers of brown, very pale brown, and light-gray fine sand. The water table normally is at a depth of about 60 inches.

Typical profile of Paola fine sand (100 feet west of U.S. Highway No. 441, one-fourth mile north of the Fort Drum store):

Ap—0 to 4 inches, dark-gray (10YR 4/1) fine sand; weak, fine, crumb structure; very friable; has a salt-and-pepper appearance in places because of mixing of organic matter and light-gray fine sand; many fine roots; very strongly acid; clear, wavy boundary.

A2—4 to 12 inches, light-gray (10YR 7/1) fine sand; single grain; loose; a few, fine roots; a few, narrow tongues of dark gray (10YR 4/1) extend downward into the horizon for several inches; very strongly acid; abrupt, irregular boundary.

C&Bh—12 to 14 inches, dark reddish-brown (5YR 3/3) fine sand; weak, fine, crumb structure; friable; a few, darker colored, weakly cemented fragments; a few to common streaks or pockets of yellowish-brown and pale-brown fine sand; a few, fine roots; very strongly acid; clear, irregular boundary.

C1—14 to 24 inches, brown (10YR 5/3) fine sand splotched with pale brown (10YR 6/3), light yellowish brown (10YR 6/4), and strong brown (7.5YR 5/8); single grain; loose; strongly acid; gradual, irregular boundary.

C2—24 to 45 inches, very pale brown (10YR 7/3) fine sand; a few, fine, prominent, brownish-yellow, yellowish-red, and light-gray mottles; single grain; loose; strongly acid; gradual, wavy boundary.

C3—45 to 66 inches +, light-gray (10YR 7/1) fine sand; a few, fine, faint mottles of brownish yellow and yellow; single grain; loose; strongly acid.

The Ap horizon ranges from gray to dark gray and is 2 to 8 inches thick. The A2 horizon is gray to white and is 2 to 20 inches thick. Depth to the C&Bh horizon is 12 to 30 inches. This layer is quite variable in color, consistence, and thickness. Much of it is brown to dark reddish brown and friable, but some is pale brown. Darker brown, weakly cemented frag-

ments are present in this layer in many places. The layer normally is 2 to 12 inches thick, but in places it is absent. The C horizon is brown to white, loose fine sand that is splotched and streaked with pale brown. Reaction in all layers ranges from very strongly acid to strongly acid. The water table is at a depth of about 48 inches for short periods during the wet season and recedes to a depth of about 72 inches in the dry season.

Included with this soil in mapping are small areas of Pomello, Immokalee, and Myakka soils. Paola fine sand lacks the well-developed organic pan present in the Pomello soil and the poorly drained Immokalee soil at a depth of more than 30 inches and in the Myakka soil at a depth of less than 30 inches.

This soil is rapidly permeable, and fertilizer leaches out readily. Available water capacity is low, and the soil is too droughty for shallow-rooted crops. Depth to the water table is a few feet from the surface, but soil properties permit rise of water through capillary action to provide sufficient moisture for deep-rooted crops. Fertility and content of organic matter are low.

Most areas of this soil are used for range; only a few areas are cultivated. Sand pine and scrub oaks that have an undergrowth of cacti and sparse stands of grasses make up the native vegetation. This soil is moderately well suited to improved pasture of deep-rooted grasses, but it is poorly suited to most cultivated crops. A few areas are planted to citrus, to which this soil is moderately well suited. Because it is higher and drier than surrounding wet soils, this soil was chosen by early settlers for use as homesites. Limitations for use as homesites are few. Capability unit IIIs-1; Sand Scrub range site; woodland group 1.

Parkwood fine sand (Pe).—This poorly drained, nearly level soil is in palm hammocks along sloughs and depressions (fig. 5). It generally occurs in small areas throughout the county.

In a typical profile the surface layer is neutral to mildly alkaline, very dark gray to black fine sand about 9 inches thick. Below is a thick layer of gray fine sandy loam (marl). Underlying layers of calcareous, mottled, gray and light-gray loamy fine sand extend to a depth of 70 inches or more. The water table normally is at a depth of about 24 inches.

***Figure 5.*—Palm hammock on Parkwood fine sand along a grassy slough.**

Typical profile of Parkwood fine sand (in a hammock area about one-fourth mile east of U.S. Highway No. 98 and 3 miles northwest of the center of Okeechobee):

A11—0 to 6 inches, very dark gray (10YR 3/1) fine sand when crushed; weak, fine, crumb structure; friable; many fine and coarse roots; has a salt-and-pepper appearance in places because of mixing of organic matter and gray sand; neutral; gradual, wavy boundary.

A12—6 to 9 inches, black (10YR 2/1) fine sand; weak, fine, crumb structure; friable; nonsticky; many fine and coarse roots; mildly alkaline; clear, wavy boundary.

B21tca—9 to 22 inches, gray (5Y 5/1) fine sandy loam (marl); a few, fine, faint, yellowish-brown mottles; massive in place, but breaks to weak granular structure; friable; nonsticky; a few to many fine and coarse roots; sand grains are coated and bridged with clay-size carbonates; calcareous; gradual, wavy boundary.

B22tca—22 to 39 inches, gray (10YR 5/1) loamy fine sand (marl); many, coarse, distinct, yellowish-brown (10YR 5/6 and 5/8) mottles; weak, medium, granular structure; friable; sand grains coated and bridged with clay-size carbonates; a few, fine roots; many roots channels filled with white (N 8/0) marl; lower part of horizon has thin pockets or lenses of white (N 8/0) fragmented marl; calcareous; gradual, wavy boundary.

B3ca—39 to 52 inches, gray (10YR 6/1) loamy fine sand (marl); many, coarse, distinct, brownish-yellow (10YR 6/8) mottles; massive in place when wet, but weak, fine, granular structure when moist; friable; a few, fine roots; root channels filled with marl; calcareous; gradual, wavy boundary.

Cg—52 to 70 inches +, light-gray (N 7/0) loamy fine sand; a few, fine, distinct, yellowish-brown mottles; single grain; loose; a few, small, semihard marl nodules; calcareous.

The A horizon is 6 to 10 inches thick. It is neutral to mildly alkaline, and in a few places it is calcareous in the lower few inches. The content of organic matter in this layer ranges from 1 to 15 percent. The upper marl layer (B21tca horizon) is gray to light-gray fine sandy loam that is 10 to 30 inches thick. It is either uniformly smooth marl or loamy material that has many gritty marl nodules. It begins at a depth between 10 and 18 inches. The layers below are grayish-colored fine sandy loam to fine sand. These layers generally are highly mottled with brownish and yellowish colors and contain nodules or flecks of marl. Reaction of these marl layers ranges from neutral to calcareous. The water table ranges from near the surface for short periods during the wet season to a depth of more than 30 inches during the dry season.

Included with Parkwood fine sand in mapping are small areas of the Ft. Drum soil, which has a lighter colored surface layer than this soil. Also included are some soils that are similar to Parkwood fine sand but have a marl layer at a depth of more than 18 inches. Other included areas consist of several large areas of soil that has marly material throughout and of small areas of soils that have a few limerock boulders at a shallow depth.

Although the water table is near the surface in the wet season, this soil has low available water capacity and is droughty in the dry season. Permeability is rapid in the surface layer and moderately rapid in the marl layers. Content of organic matter is low to high, and fertility is moderately low.

This soil has a dense cover of hammock vegetation that consists mainly of cabbage-palms, though oaks and other hardwoods grow in some places. The understory consists of shrubs, vines, and grasses. The hammock areas produce little forage, but they provide desirable shelter areas within areas of open

range for both cattle and wildlife. For this reason, and because the cost of clearing is high, most areas remain in native vegetation.

If simple surface drainage is provided, this soil is well suited to improved pasture. Under good management that includes a complete water control system, which provides for both drainage and irrigation, this soil is also well suited to special crops and to citrus. Capability unit IIIw-2; Hammock range site; woodland group 6.

Placid fine sand (Pf).—This very poorly drained, dark-colored, nearly level, sandy soil is in low areas throughout the county.

In a typical profile the surface layer is very strongly acid, black to very dark gray fine sand about 20 inches thick. The upper part has a high content of organic matter, and the lower part has streaks and pockets of grayish-colored sand. Below are layers of strongly acid, gray and grayish-brown fine sand that have dark-colored mottles. The water table is near or above the surface most of the time.

Typical profile of Placid fine sand (in a flag pond about one-half mile south of State Route 68 and 2½ miles west of U.S. Highway No. 441):

A11—0 to 10 inches, black (10YR 2/1) fine sand; moderate, medium, crumb structure; friable; a few, small pockets of dark-gray (10YR 4/1) and gray (10YR 5/1) fine sand; many fine and medium roots; organic-matter content is about 14 percent; very strongly acid; gradual, smooth boundary.

A12—10 to 20 inches, very dark gray (10YR 3/1) fine sand; weak, fine, crumb structure; very friable; many fine and medium roots; lower part of this horizon has narrow tongues and pockets of black (10YR 2/1), dark gray (10YR 4/1), and very dark grayish brown (10YR 3/2); very strongly acid; clear, wavy boundary.

C1—20 to 30 inches, gray (10YR 5/1) fine sand; a few, fine, faint, dark-gray and very dark gray mottles; single grain; loose; a few, fine roots; strongly acid; gradual, wavy boundary.

C2—30 to 48 inches, grayish-brown (10YR 5/2) fine sand; common, medium, faint, very dark gray and very dark grayish-brown mottles; single grain; loose; strongly acid; gradual, wavy boundary.

C3—48 to 75 inches +, dark grayish-brown (10YR 4/2) fine sand; a few, fine, faint, very dark gray mottles; single grain; loose; strongly acid.

This soil is fine sand to a depth of 75 inches or more. Reaction throughout the soil profile ranges from extremely acid to strongly acid. Some areas have a thin surface layer of peat or muck. In most areas the soil has a black A11 horizon that is 5 to 18 percent organic matter. The A12 horizon is very dark gray to black and contains less organic matter than the A11 horizon. Total thickness of the dark-colored A1 horizon ranges from 10 to 24 inches. The underlying layers are dark grayish brown to light gray and have a few to many mottles. Most areas of this soil are ponded for more than 6 months each year.

Included with this soil in mapping are ponded areas of Basinger soil and spots of St. Johns soil along the edges of this soil. Also included are small areas of Pamlico soils in the deeper centers of some ponds.

Although this soil is normally wet, it is rapidly permeable, and can be drained readily if outlets are available. Available water capacity is moderate, especially in the surface layer. Content of organic matter is high, but natural fertility is low.

This soil is used primarily as native range. Most areas consist of shallow ponds or small grassy sloughs that have a cover of pickerelweed and maidencane. If a drainage system is provided that removes excess surface water, this soil is well suited to improved pasture. Under good management that includes a complete water control system, this soil is also well suited to truck and special crops. Ponded areas within pasture and rangeland are best kept in their natural state and used as ponds for watering livestock and as habitat for wildlife. Capability unit IIIw-5; Sand Pond range site; woodland group 7.

Placid, Pamlico, and Delray soils, ponded (Ph).—This undifferentiated unit consists of nearly level soils that are very poorly drained. These soils occur throughout the county in swamps and along heavily wooded drainageways. Most areas are in the eastern part of the county on narrow bottom lands along streams. All of the areas are covered by water most of the time or are subject to frequent flooding.

Most areas mapped are dominated by Placid fine sand. Other areas are dominated by either Pamlico muck or Delray fine sand. No mapped areas contain all of these soils because of differences in acidity. A typical profile of each soil is described in the mapping units Placid fine sand, Pamlico muck, and Delray fine sand.

Included in mapping with these soils in most areas where the Placid soil is dominant are areas of acid flatwoods soils. Where the Pamlico soil is dominant, the Placid soil is included. Where the Delray soil is dominant, small areas of the Pompano and Okeelanta soils are included.

Most areas of this unit are heavily wooded and occupy the lowest areas in the landscape. Only a few drainage outlets are present. The content of organic matter is high, but the content of most plant nutrients is low.

These soils are mostly in heavily wooded swamps under native vegetation. The plant cover consists of sweetbay, sweetgum, cypress, brackenfern, sawgrass, and other plants that tolerate wetness. Because of the dense cover of woodland vegetation and lack of adequate drainage outlets, reclamation generally is not feasible. Drainage outlets are accessible in a few areas, and these areas can be protected from floods and reclaimed. Then they can be used the same as soils in capability subclass IIIw. Most areas of this unit are best left in their native state and used for timber production and as wildlife habitat. Capability unit VIIw-1; Swamp range site; woodland group 7.

Pomello fine sand (Pm).—This deep, moderately well drained, nearly level, sandy soil is on low ridges and knolls in the flatwoods area. It occurs in many parts of the county, but most areas are in the eastern part.

In a typical profile the surface layer is very strongly acid, gray fine sand about 4 inches thick. The subsurface layer is thick, white fine sand. At a depth of about 42 inches is a dark reddish-brown organic pan of fine sand. Below a depth of about 54 inches is dark reddish-brown and brown fine sand. The water table normally is at a depth of 48 to 60 inches.

Typical profile of Pomello fine sand (next to State Route 68, 2½ miles west of U.S. Highway No. 441 and 10 miles north of the center of Okeechobee);

A1—0 to 4 inches, gray (N 6/0) fine sand; weak, fine, crumb structure; very friable; many, fine and medium roots; very strongly acid; clear, wavy boundary.

A2—4 to 42 inches, white (N 8/0) fine sand; single grain; loose; common fine and medium roots and a few coarse roots; a few thin streaks of dark gray in old root channels; very strongly acid; 1 to 2 inches transitional layer that has a wavy boundary.

B2h—42 to 47 inches, dark reddish-brown (5YR 2/2) fine sand that has pockets of dark reddish brown (2.5YR 3/4) and black (5YR 2/1); massive in place, but crushes to weak, fine, crumb structure; friable; weakly cemented; common fine and medium roots; a few small pockets of light-gray fine sand; very strongly acid; clear, wavy boundary.

B3&Bh—47 to 54 inches, dark reddish-brown (5YR 3/3) fine sand; a few, coarse, dark-brown (7.5YR 3/2) mottles; massive, crushes to weak, fine, crumb structure; weakly cemented fragments of dark reddish brown (5YR 2/2); a few medium roots; very strongly acid; clear, wavy boundary.

C—54 to 66 inches +, brown (10YR 4/3) fine sand; common, medium, faint, dark-brown mottles; single grain; loose; very strongly acid.

This soil is fine sand to a depth of 72 inches or more. Reaction throughout the profile ranges from strongly acid to very strongly acid. The A1 horizon is gray or light gray and is 1 to 6 inches thick. The A2 horizon ranges from light gray to white and is 30 to 56 inches thick. The organic pan layer (B2h horizon) is black to dark reddish brown, and in some places it has pockets and tongues of light gray from the A2 horizon. It is 2 to 6 inches thick and is weakly cemented in the upper part. It overlies a dark reddish-brown to reddish-brown layer that contains darker colored, weakly cemented fragments from the B2h horizon. Below is brownish-colored, loose sandy material that contains some mottles or small iron concretions. Depth to the water table ranges from 30 to 75 inches between wet and dry seasons.

Included with Pomello fine sand in mapping are small areas of similar soils that have an organic pan at a shallower depth and some wet soils that have no pan layer within a depth of 72 inches. Also included are small areas of the Immokalee soil, which is darker colored and more poorly drained than this soil.

Pomello fine sand is rapidly permeable, has low available water capacity, and is droughty most of the time. Content of organic matter and natural fertility are very low.

Most areas of this soil remain in native vegetation and are used for range and wildlife. The plant cover consists of scrub oaks, saw-palmettos, woody shrubs, many kinds of grasses, and scattered stands of slash pine.

This soil is very poorly suited to cultivated crops or citrus. If intensive management is used, however, improved pastures made up of deep-rooted grasses that resist drought provide fairly good grazing. The areas make desirable homesites because they are slightly elevated above the adjacent flatwoods and are dry. Capability unit VIs–1; Sand Scrub range site; woodland group 1.

Pompano fine sand (Pn).—This deep, poorly drained, nearly level soil is in grassy sloughs and depressions. It occurs in all parts of the county.

In a typical profile the surface layer is dark-gray to grayish-brown fine sand about 16 inches thick. Below, to a depth of about 30 inches, is very pale brown fine sand that has a few to many mottles. Light-gray fine sand extends below this layer to a depth of 75 inches or more. The water table normally is at a depth of about 20 inches.

Typical profile of Pompano fine sand (in a slough just south of a graded road, 1½ miles west of Trice Dairy, and about 3½ miles southwest of Fort Drum):

A11—0 to 5 inches, dark-gray (10YR 4/1) fine sand; weak, fine, crumb structure; very friable; many fine roots; in places has a salt-and-pepper appearance when dry because of mixing of organic matter and light-gray sand; medium acid; gradual, smooth boundary.

A12—5 to 16 inches, grayish-brown (10YR 5/2) fine sand; a few, fine, distinct, strong-brown (7.5YR 5/6) mottles; single grain; loose; many fine roots; common, fine, dark grayish-brown streaks in root channels; slightly acid; gradual, wavy boundary.

C1—16 to 30 inches, very pale brown (10YR 7/3) fine sand; a few, coarse, faint, pale-brown mottles and a few, fine, distinct, yellow (10YR 7/6) and reddish-yellow (5YR 6/8) mottles; single grain; loose; a few fine roots; slightly acid; gradual, wavy boundary.

C2—30 to 75 inches +, light-gray (10YR 7/1) fine sand; single grain; loose; slightly acid.

This soil is fine sand texture to a depth of 72 inches or more. Reaction in the A horizon ranges from medium acid to slightly acid and in the underlying layers from slightly acid to mildly alkaline. The A11 horizon is gray to black and is 2 to 8 inches thick. This layer generally is thinner where the colors are darker. The A12 horizon is dark gray to light gray and grayish brown and is 3 to 13 inches thick. The C1 horizon is within a depth of 30 inches and is light brownish in color. It is 10 to 30 inches thick. The C2 horizon is gray to white sand. The water table is at a depth of 0 to 15 inches for a period of 2 to 6 months each year. A few inches of water covers the surface for short periods during the wet season.

Included with this soil in mapping are small areas of the Charlotte, Felda, Delray, and Immokalee soils. Ponded areas of this soil are also included, and these make up about 10 percent of each mapped area. This soil is similar to the Charlotte soil, but it lacks the bright colored subsoil (Bir horizon) typical of that soil. It also lacks the loamy subsoil horizons of the Felda and Delray soils and the organic pan of the Immokalee soil.

Although this soil normally is wet, it is rapidly permeable and responds readily to simple drainage practices. Available water capacity is low, however, and when this soil is drained, it is droughty during dry periods. Content of organic matter and fertility are low.

Most areas of this soil are in grassy sloughs and are used for range to which this soil is well suited. If simple drainage practices are applied, this soil is well suited to improved pasture and a large acreage is in this use. Under a high level of management that includes complete water control, this soil is suited for tomatoes, other truck crops, and special crops. It is poorly suited to citrus. Capability unit IVw–3; Slough range site; woodland group 7.

Seewee fine sand (Se).—This deep, moderately well drained to somewhat poorly drained, nearly level to gently sloping, sandy soil overlies a dark-colored buried soil. It occupies a long, narrow, wooded ridge that parallels the shoreline of Lake Okeechobee.

In a typical profile the surface layer is dark-gray fine sand about 5 inches thick. Just below is a thick layer of white sand. At a depth of about 36 inches is black mucky sand that is the surface layer of an old buried soil and is about 17 inches thick. Light brownish-gray sand occurs below this layer. The water table normally is at a depth of 48 to 60 inches.

Typical profile of Seewee fine sand (near U.S. Highway No. 441 and about 9 miles southeast of the center of Okeechobee):

Ap—0 to 5 inches, dark-gray (10YR 4/1) fine sand; weak, fine, crumb structure; very friable; many fine roots; slightly acid; clear, smooth boundary.

C1—5 to 36 inches, white (10YR 8/2) sand; single grain; loose; a few fine and coarse roots; slightly acid; clear, wavy boundary.

Ab—36 to 53 inches, black (10YR 2/1) mucky sand; moderate, medium, granular structure; friable; many, small, white (10YR 8/2) sand pockets; many fine roots; neutral; gradual, wavy boundary.

C2—53 to 63 inches +, light brownish-gray (10YR 6/2) sand; single grain; loose; neutral.

This soil is sandy to a depth of 80 inches or more. Reaction in the Ap and C1 horizon ranges from medium acid to neutral and in the buried layer (Ab horizon) from slightly acid to mildly alkaline. Color of the Ap horizon ranges from gray to black. This layer is 2 to 6 inches thick. The C1 horizon ranges from grayish brown to white. Thickness of this layer ranges from 2 to 42 inches, depending upon the position of the soil on the ridge. The Ab horizon is black mucky sand or sand and is 5 to 25 percent organic matter. It is 4 to 20 inches thick. Color of the C2 horizon is dark grayish brown to

white. In some places pockets or lenses of shells occur in one or more layers of this soil. The water table rises to a depth of about 30 inches for a short time during a wet season and may drop below a depth of 60 inches during a dry season.

Included with Seewee fine sand in mapping are small areas of Pompano soil and of other similar soils. Seewee fine sand is similar to the Pompano soil in the horizons above the buried soil, but it is better drained. In the southeastern corner of the county is a soil that has an old buried surface layer (Ab horizon) that has a higher organic-matter content than this soil and in some areas approaches peat or muck. Other included small areas of soils have a buried layer (Ab horizon) at a depth of more than 40 inches or have several, thin buried layers and intervening layers of light-colored sandy material.

This soil is rapidly permeable and highly leached. Because the available water capacity is low, this soil is droughty during the dry season. Fertility and content of organic matter are low in the surface layer.

The native vegetation on this soil is primarily cabbage-palms, cypress, oaks, and other hardwoods that have an understory of various kinds of shrubs and grasses. In places the understory has been cleared and the areas are used as pasture and to provide shelter for livestock. Because of its location and small acreage, this soil seldom is used for cultivated crops. It is well suited to small plantings of citrus and to use as homesites. Capability unit IIIs-1; Hammock range site; woodland group 1.

Spoil banks (Sp).—This land type consists of a mixture of sandy and loamy materials and shell fragments. These materials were removed by dragline or were pumped hydraulically from the new channel of the Kissimmee River and from the edges of Lake Okeechobee. Around the lake the spoil materials were used to form a levee. Along the Kissimmee River the materials were deposited as spoil banks along the channel or were pumped into large areas surrounded by dikes. The spoil ranges from 6 inches to about 20 feet in thickness.

The spoil material consists of gray to white sand that contains shells and lumps of gray, greenish-gray, or bluish-gray sandy loam or sandy clay loam. Interspersed layers of sandy, loamy, and shelly materials occur in the spoil but not in any consistent order. In places along the channel of the Kissimmee River where the spoil materials were removed from areas of organic soils, they contain pockets of organic material.

Spoil banks is poorly suited to plants. Most areas consist of infertile and erodible geologic materials from the bottom of channels. These materials generally have a low content of organic matter. Available water capacity is variable. Except where the spoil material can be used to build levees or dikes, it has little use other than for wildlife habitat. Not placed in a capability unit, range site, or woodland group.

St. Johns sand (St).—This deep, poorly drained, nearly level, sandy soil occupies narrow areas in low flatwoods that border wetter areas. It occurs throughout the county, but most areas are in the eastern half.

In a typical profile the surface layer is black to very dark gray sand about 14 inches thick. The subsurface layer is light-gray sand about 8 inches thick. At a depth of about 22 inches is a thick, sandy, weakly cemented organic pan that is black in the upper part and dark reddish brown in the lower part. Below a depth of 42 inches is dark-brown sand that extends to a depth of more than 60 inches. The water table normally is at a depth of about 20 inches.

Typical profile of St. Johns sand (near Hilolo Road, 1¾ miles north of State Route 68 and about 4 miles southeast of Fort Drum):

A11—0 to 10 inches, black (10YR 2/1) sand; weak, fine, crumb structure; friable; many fine, medium, and coarse roots; many, clean, light-gray sand grains; about 15 percent is organic matter; very strongly acid; clear, smooth boundary.

A12—10 to 14 inches, very dark gray (10YR 3/1) sand; single grain; loose; common fine roots; very strongly acid; gradual, smooth boundary.

A2—14 to 22 inches, light-gray (10YR 6/1) sand; single grain; loose; a few fine and medium roots; very strongly acid; ½ to 1 inch transitional layer that has a wavy boundary.

B21h—22 to 34 inches, black (10YR 2/1) sand; massive; firm; weakly cemented; common fine, medium, and coarse roots; very strongly acid; clear, wavy boundary.

B22h—34 to 42 inches, dark reddish-brown (5YR 2/2) sand; massive; friable; very weakly cemented; common pockets of very dark brown (10YR 2/2); a few, small, black (10YR 2/1) concretions or firm, weakly cemented fragments; a few fine roots; very strongly acid; gradual, wavy boundary.

B3—42 to 66 inches, dark-brown (7.5YR 3/2) sand; common, medium, faint, very dark brown, dark grayish-brown, and dark yellowish-brown mottles; single grain; loose; nonsticky; a few, fine roots; very strongly acid; gradual, wavy boundary.

C—66 to 72 inches +, pale-brown (10YR 6/3) sand; single grain; loose; nonsticky; very strongly acid.

This soil is strongly acid to very strongly acid throughout. It is sand to a depth of more than 72 inches. The A1 horizon is black to very dark gray and is 8 to 18 inches thick. In the upper part the organic-matter content ranges from 3 to 15 percent. The A2 horizon is gray to white sand and is 6 to 18 inches thick. An organic pan layer (B2h horizon) occurs within a depth of 30 inches. The upper part of this layer is weakly cemented, black to very dark brown sand 2 to 12 inches thick. The lower part is very dark brown to dark reddish brown and may be weakly cemented or may contain darker colored, weakly cemented fragments. Layers of brownish- and grayish-colored sand that is mottled in places occur below the organic pan. During a wet season the water table is within 0 to 15 inches of the surface for a period of 2 to 6 months and the soil may be covered by a few inches of water for brief periods. In a dry season the water table recedes to a depth of about 30 inches.

Included with this soil in mapping are small areas of Myakka, Immokalee, and Placid soils. Also included are small areas of soils that are similar to St. Johns sand but have an organic pan directly below the surface layer (A1 horizon). St. Johns sand has a thicker surface layer (A1 horizon) than the Myakka and Immokalee soils. Unlike the Placid soil, it has an organic pan layer.

Although this soil is seasonally wet, it is rapidly permeable and can be drained with little difficulty. Available water capacity is low. Fertility is low, and content of organic matter is medium.

Most areas of this soil remain in native vegetation and are used for range and wildlife, to which the soil is well suited. The plant cover is mainly a dense growth of saw-palmettos, but grasses, woody shrubs, and a few scattered pine trees grow in some areas.

If a simple drainage system that removes excess surface water is provided, this soil is well suited to improved pasture. Under a complete water control system, this soil also is well suited to truck crops and cut flowers. Some areas are well suited to citrus, but intensive water control measures and other good management practices are needed. Capability unit IIIw-3; Acid Flatwoods range site; woodland group 4.

Terra Ceia peat (Tc).—This very poorly drained, nearly level, organic soil is in depressions and broad marshes. It occurs primarily in a few areas in the south-central part of the county.

In a typical profile the surface layer is dark reddish-brown fibrous peat about 8 inches thick. Just below is a

very thick layer of black muck. At a depth of about 48 inches is a layer of black sand that overlies lighter colored sand. This soil is either flooded or the water table is near the surface most of the time.

Typical profile of Terra Ceia peat (on the King Ranch about three-fourths mile south of State Route 70 and 1½ miles southeast of the center of Okeechobee):

1—0 to 8 inches, dark reddish-brown (5YR 2/2) fibrous peat; moderate, coarse, subangular blocky structure, but crushes to fine and medium, granular; friable; many fine and medium roots form a partial root mat; many black granules of muck; slightly acid; clear, wavy boundary.

2—8 to 48 inches, black (10YR 2/1) muck; weak, coarse, subangular blocky structure, but crushes to medium and coarse, granular; friable; many small pockets and thin lenses of dark-brown fibrous peat; many fine and medium grass roots; neutral; gradual, wavy boundary.

Ab—48 to 54 inches, black (10YR 2/1) fine sand; single grain; loose; nonsticky; many streaks and pockets of light-gray fine sand; common tongues and small pockets of black muck; common fine roots; neutral; gradual, smooth boundary.

C—54 to 60 inches +, dark-gray (10YR 4/1) fine sand; many, fine and medium, faint, black and very dark gray mottles or streaks in old root channels; single grain; loose; nonsticky; neutral.

The surface layer is black to dark reddish-brown fibrous peat or granular muck and is 6 to 15 inches thick. The next layer is black to very dark brown muck or peaty muck with pockets and thin lenses of fibrous peat. This layer is 24 to 48 inches thick and extends below a depth of 36 inches. At a depth of about 48 inches is a thin layer of black sand that is about 1 to 15 percent organic matter. The sand below this depth is dark gray to light gray or grayish brown and extends to a depth of more than 60 inches. Reaction ranges from medium acid to neutral in the surface layer and from slightly acid to mildly alkaline in the underlying organic and sandy layers.

Included with Terra Ceia peat in mapping are small areas of Okeelanta soil and a few small areas in the southern part of the county that are underlain by limerock or shell. Unlike the Okeelanta soil Terra Ceia peat has a thin layer of peat that overlies a thick layer of muck. Also included are small areas of Terra Ceia soils that have a surface layer of muck or that have less than 36 inches of muck over a sandy subsoil. Other included small areas consist of stratified layers of peat and muck.

This soil is covered by water most of the time and many areas lack adequate drainage outlets. In areas where drainage outlets are available, this soil can be drained and cultivated. After it is reclaimed, however, subsidence by oxidation is a continuous hazard. Available water capacity is high, and permeability is rapid. Content of nitrogen is high, but content of other plant nutrients is low.

Most areas of this soil remain in native vegetation and are used primarily for native range and as wildlife habitat. The plant cover consists mostly of sawgrass and other aquatic plants but includes a few scattered cypress trees.

If a drainage system is provided that removes excess surface water, this soil is well suited to improved pasture. Under a high level of management that includes a complete water control system, the soil is also well suited to truck crops and sugarcane, but it is not suited to citrus. Capability unit IIIw-6; Everglades Marsh range site; woodland group 8.

Wabasso fine sand (Wa).—This poorly drained, nearly level, sandy soil is in the flatwoods. The areas are small and occur throughout the county.

In a typical profile the surface layer is very strongly acid, very dark gray fine sand about 4 inches thick. The subsurface layer is gray fine sand about 12 inches thick. At a depth of about 16 inches is a dark reddish-brown, weakly cemented organic pan about 12 inches thick, which overlies a thin layer of very pale brown fine sand. Below a depth of about 32 inches is a thin layer of neutral, mottled, light-gray heavy fine sandy loam. This is underlain by a thick layer of mildly alkaline, mottled, yellowish-brown fine sandy loam that is underlain by light-gray and gray sandy materials. The water table normally is at a depth of about 30 inches.

Typical profile of Wabasso fine sand (near U.S. Highway No. 98 and Airport Road and about 2½ miles northwest of the center of Okeechobee):

A1—0 to 4 inches, very dark gray (10YR 3/1) fine sand; weak, fine, crumb structure; very friable; has a salt-and-pepper appearance because of mixing of organic matter and light-gray sand; many fine and medium roots; very strongly acid; clear, smooth boundary.

A2—4 to 16 inches, gray (10YR 5/1) fine sand; single grain; loose; common fine and medium roots; transitional layer ½ to 1 inch thick that has a wavy boundary; strongly acid.

Bh—16 to 28 inches, dark reddish-brown (5YR 2/2) fine sand; massive in place, but crushes to moderate, fine, crumb structure; weakly cemented; very friable; common fine and medium roots; strongly acid; gradual, smooth boundary.

A'2—28 to 32 inches, very pale brown (10YR 7/3) fine sand; single grain; loose; common fine and medium roots; neutral; clear, wavy boundary.

B'21t—32 to 36 inches, light-gray (10YR 6/1) heavy fine sandy loam; many, medium, distinct, brownish-yellow (10YR 6/8) mottles; weak, coarse, subangular blocky structure; slightly sticky, slightly plastic; common fine and medium roots; a few, small iron concretions; neutral; gradual, wavy boundary.

B'22t—36 to 48 inches, yellowish-brown (10YR 5/8) fine sandy loam; many, coarse, distinct mottles and pockets of light gray (10YR 6/1); weak, medium, subangular blocky structure; slightly sticky, slightly plastic; a few, fine and medium roots; streaks of white marl in root channels; mildly alkaline; gradual, wavy boundary.

C'1g—48 to 60 inches, light-gray (10YR 7/1) loamy fine sand; many, medium and coarse, brownish-yellow (10YR 6/6) mottles; massive; friable; strong-brown iron concretions; a few fine and medium roots; mildly alkaline; gradual, wavy boundary.

C'2g—60 to 75 inches +, gray (N 6/0) fine sand; common, medium and coarse, light olive-brown (2.5Y 5/6) mottles; single grain; loose; mildly alkaline.

The A1 horizon is dark-gray to black fine sand 4 to 8 inches thick. The A2 horizon is gray or grayish-brown to white fine sand 8 to 22 inches thick. The organic pan layer (Bh horizon) occurs within a depth of 12 to 30 inches. This layer is black to very dark brown or dark reddish-brown fine sand, and it is weakly cemented with organic matter. It is 4 to 14 inches thick. A thin, grayish or brownish A'2 horizon occurs in some places. At a depth ranging from 20 to 36 inches are layers of highly mottled, grayish and brownish heavy fine sandy loam to sandy loam. These layers range from 6 to 24 inches in thickness and in some places have a few white marl nodules in the lower part (fig. 6). Reaction in the A1 horizon and through the organic pan layer (Bh horizon) ranges from strongly acid to very strongly acid. In all layers below the organic pan, reaction ranges from medium acid to mildly alkaline. The sandier substratum is gray to white and extends to a depth below 75 inches. The water table is at a depth of 0 to 15 inches for a period of 1 to 2 months during the wet season but may recede to a depth of more than 30 inches in a dry season.

Included with this soil in mapping are small areas of the Bradenton, Myakka, and Immokalee soils. Also included are soils that are similar to Wabasso fine sand but have a thick, dark surface layer or a more acid, loamy subsoil. Wabasso fine sand is similar to the Bradenton soil but has an organic pan. Unlike the Myakka and Immokalee soils, Wabasso fine sand has a loamy subsoil below the pan.

Figure 6.—**Typical profile of Wabasso fine sand showing the dark organic pan and the underlying fine sandy loam. White marl nodules are in the bottom of the hole on the right.**

The surface layer of Wabasso fine sand is rapidly permeable and has low available water capacity. The subsoil is moderately permeable and has moderate available water capacity. Although this soil is seasonally wet, it responds well to drainage and good management. Fertility is low to moderate, and content of organic matter is low.

Most areas of this soil remain in native vegetation and are used for range, to which the soil is well suited. The plant cover consists mainly of pine trees, saw-palmettos, woody shrubs, and grasses, but cabbage-palms grow in scattered areas.

If simple drainage practices are applied, Wabasso fine sand is well suited to improved pasture. Under good management that includes complete water control measures, this soil is also well suited to truck and special crops. Where water management practices are carefully designed and properly maintained, this soil is one of the best in the county for citrus. Capability unit IIIw-1; Sweet Flatwoods range site; woodland group 3.

Use and Management of the Soils[3]

The soils in Okeechobee County are used mostly for pasture, range, and woodland, though some special cultivated crops and citrus are grown. This section explains how the soils can be managed for these main uses. It also explains the capability classification system, describes the capability units, and gives the estimated yields of the principal crops grown. In addition, it explains how the soils can be managed for range, for woodland, for wildlife, and for building highways, farm ponds, irrigation systems and other engineering structures.

[3] ROBERT M. CRAIG, conservation agronomist, Soil Conservation Service, assisted in the preparation of this section.

General Management for Cultivated Crops and Pasture

Most of the soils in Okeechobee County have serious limitations or hazards that must be overcome before cultivated crops can be grown successfully or the areas can be used for improved pasture. In a good management plan, these limitations or hazards are considered and adequate measures are provided to correct or eliminate them.

Most of the soils in this county are affected by a high water table, either continuously or seasonally. At certain times of the year, many of the soils have excess water in the root zone that is harmful to crops. In dry seasons crops grown on some of these same soils may be damaged by a shortage of water. A combined drainage and irrigation system provides a high degree of water control by removing excess water in wet seasons and by supplying water to the soils in dry seasons. A subsurface irrigation system like that briefly described in the section "Engineering Uses of the Soils" is the standard means of accomplishing good water control in this county.

Erosion is not a serious problem in this county, because most of the soils are highly permeable and are nearly level. Along ditchbanks and dikes, however, erosion does occur, if protection is not provided. Most of the soils are deep, but they are primarily sandy and have low water-holding capacity and low capacity to hold plant nutrients. These poor soil qualities can be improved somewhat if grasses, such as hairy indigo, are grown in the periods between harvested crops. Turning under all plant residues left in cultivated fields also helps to improve the soil.

Most of the soils of the county are highly leached of important plant nutrients. Their natural fertility, therefore, generally is low. The response to fertilizer varies, depending on the kinds of soils and the type of management used, but large amounts of fertilizer are needed on most soils. Even though intensive management is needed to overcome the generally poor soil qualities, the favorable climate makes such management practical.

Tomatoes and watermelons are the only special crops grown on a commercial scale in this county. They are grown on poorly drained, nonacid soils in sloughs and on flatwoods soils. All of these soils need a complete water control system to maintain a uniform supply of moisture. Such a system should include carefully designed ditches, dikes, and pumps that remove excess water in wet seasons and supply water through subsurface irrigation in dry seasons. Large amounts of lime and fertilizer are needed.

The hammock areas generally are not used for tomatoes and watermelons. The soils in these areas are shallow and difficult to manage. Also, the cost of clearing is high. Use of moderately well drained soils for these crops is limited because of droughtiness and the difficulty of maintaining a uniform supply of moisture. The soils near Lake Okeechobee are not used for tomatoes, mainly because of their high content of organic matter and the difficulty of controlling the release of nitrogen.

Tomatoes commonly are grown only once in the same field. In this way soil-borne diseases, viruses, nematodes, and insects that appear or intensify after the first crop are avoided. Using a rotation that includes 3 or 4 years of pangolagrass between tomato crops also reduces or eliminates these problems.

Where watermelons are grown, strips of sunflowers or sorghum are needed to protect the soils and young plants from wind damage.

Most citrus crops are grown on the more alkaline soils, such as the Parkwood, Bradenton, Felda, Wabasso, and Adamsville (fig. 7). Citrus is also grown, however, on some areas of acid flatwoods soils. On all of these soils management that includes deep drainage, bedding, and either subsurface or sprinkler irrigation is needed. Fertilizers also are needed and pests should be controlled. A small acreage of citrus is planted on the moderately well drained Paola soil which does not need drainage but does require irrigation. A cover crop is needed in all newly bedded groves to protect the soil from blowing and to prevent wind damage to the young trees.

Improved pastures have been established in the county on most kinds of soils. A system for water control that removes excess surface water is needed. Also needed are proper amounts of fertilizer and lime and other good management. Subsurface irrigation is used in some areas to provide adequate moisture for growth of clover in winter. Pangolagrass and bahiagrass are suitable pasture grasses. White clover, Hubam clover, and mixtures of clover and grass can be grown for winter grazing if irrigation facilities are available (fig. 8). A good pasture serves other purposes beside supplying forage for livestock. It protects the soils from erosion by wind and water and improves the quality of the soils by adding organic matter, making a better environment for microorganisms, and improving tilth.

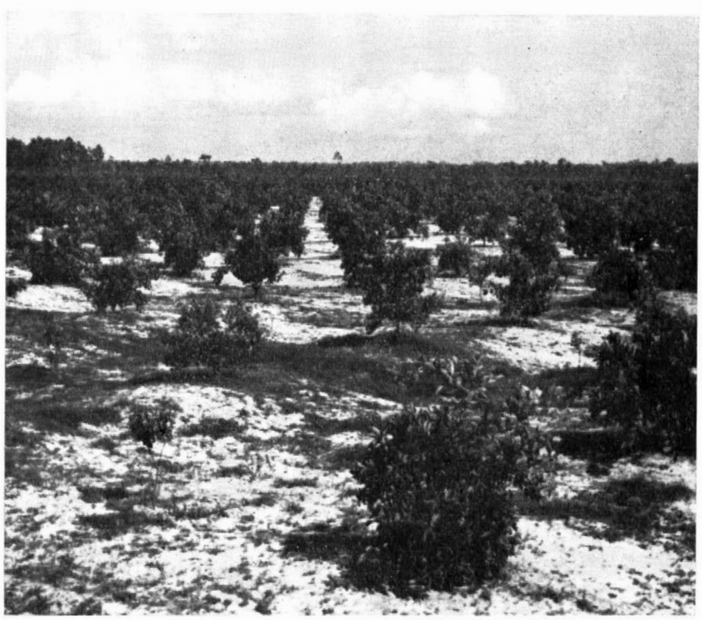

***Figure 7.*—Young orange grove planted on Bradenton, Felda, and Adamsville soils under a water control system that includes bedding, lateral ditches, perimeter canals, and reversible pumping stations.**

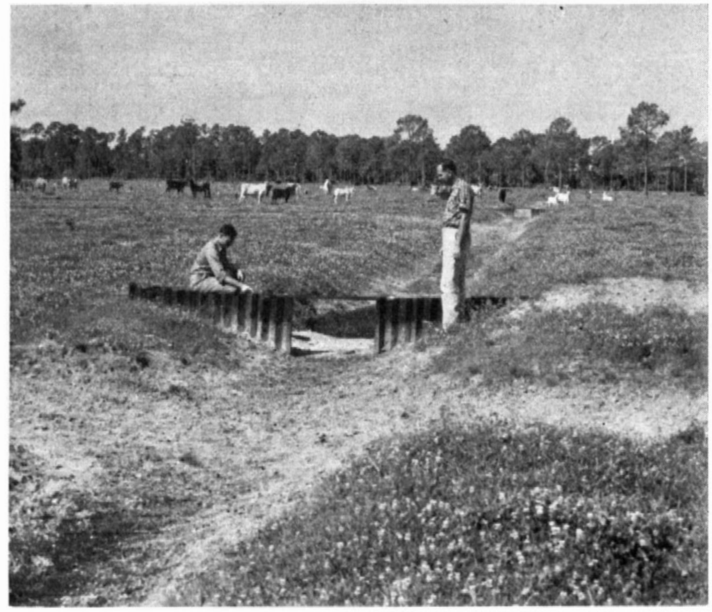

***Figure 8.*—Improved pasture of grass and clover on Myakka fine sand. The structures for control of water provide surface drainage in wet seasons and irrigation in dry seasons.**

General management practices are not discussed in detail in this survey but are outlined briefly in each capability unit. Management practices suggested for different crops on different soils change as more and better information is gained from the experience of workers at the experiment stations and from the experience of farmers and ranchers. Current information regarding kinds of crops, improved varieties of plants, specific management practices, and other information can be obtained from a local representative of the Soil Conservation Service, the University of Florida Agricultural Experiment Stations or the County Extension Service.

Management of the Soils by Capability Units

In this subsection the system of capability grouping is explained, the soils of the county are placed in capability units, and use and management is suggested for the soils of each unit. In planning management of the soils, the factors that affect the use of the soils for cultivated crops and pastures need to be considered. Those factors are described in the preceding section.

Capability grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or engineering.

In the capability system, all kinds of soils are grouped at three levels, the capability class, subclass, and unit. These are discussed in the following paragraphs.

Capability Classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use. (None in Okeechobee County.)

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. (None in Okeechobee County.)

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. (None in Okeechobee County.)

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIIw. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, but not in Okeechobee County, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

Capability Units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIIw-2 or IVw-3. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation, and the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph. The Arabic numeral specifically identifies the capability unit within each subclass.

In the following pages the capability units in Okeechobee County are described and suggestions for the use and management of the soils are given.

CAPABILITY UNIT IIIw-1

In this capability unit are nearly level, poorly drained fine sands that have a loamy subsoil. These soils are in hammocks and flatwoods. In some areas the thin, dark-colored, medium acid to neutral surface layer is underlain by thick layers of slightly acid to mildly alkaline and calcareous sandy loam. In other areas the soil has a strongly acid to very strongly acid sandy surface layer underlain by an organic pan and a neutral to mildly alkaline loamy subsoil.

Available water capacity is low in the surface layer of these soils, but it is moderate in the subsoil. The water table normally is at a depth of 15 to 30 inches but rises to near the surface for short periods during wet seasons. Permeability is moderate to rapid. The response to simple drainage practices is good. The content of organic matter is low, and natural fertility is low to moderate.

The native vegetation in the hammock areas consists mostly of cabbage-palms but includes some pines and oaks. In the flatwoods the vegetation consists of saw-palmettos, scattered cabbage-palms, and various shrubs and grasses. Most areas remain in native vegetation.

If these soils are managed properly, they are some of the best in the county for farming. A system that provides drainage and irrigation by controlling the water table is needed. Then special truck and flower crops can be grown. Citrus fruits also can be grown, but the areas will require bedding. Crops grown on these soils respond well if fertilizer and lime are applied. If citrus fruits are grown, fertilizer must be applied frequently.

High quality pastures consisting of improved grasses or of mixtures of grasses and clover can be produced under good management. A drainage system is needed for removing excess surface water, and subsurface irrigation is required for pastures that include clover. Liberal applications of fertilizer are needed, and occasionally lime should be applied. In addition grazing must be controlled.

CAPABILITY UNIT IIIw-2

Parkwood fine sand is the only soil in this capability unit. It is a nearly level, poorly drained, calcareous soil on hammocks. This sandy soil has thick layers of loamy, calcareous material (marl) within a depth of 18 inches.

As a result, the availability of water and some plant nutrients for plant growth are lowered.

Permeability is rapid in the surface layer of this soil and moderately rapid in the underlying loamy layers. The content of organic matter is low to high. Natural fertility is moderately low.

Areas of this soil support a dense growth of vegetation that consists mainly of cabbage-palms but includes some pines and several kinds of oak and other hardwoods. The understory is made up of shrubs, vines, and grasses. Most areas remain in native vegetation. Where development is feasible, however, the soil is suited to special cultivated crops and to pasture.

Because this soil is wet and shallow to marl, it is severely limited for cultivated crops. In cleared areas, a system that provides drainage and irrigation by controlling the water table is needed. Then special truck and flower crops can be grown. Sufficient fertilizer to meet the needs of the crop is required. Lime is not needed, and the naturally high content of lime in this soil may be harmful to some crops.

This soil is moderately well suited to citrus. Spots of hard marl and limerock are near the surface in some places. Areas used for citrus require bedding, complete water control measures that include deep drainage, and adequate amounts of fertilizer.

Improved pastures of excellent quality can be grown on this soil. A drainage system is needed that removes excess surface water. Adequate amounts of fertilizer should be applied. In addition grazing must be controlled.

CAPABILITY UNIT IIIw-3

St. Johns sand is the only soil in this capability unit. It is a nearly level, poorly drained soil that is strongly acid. This soil has a dark-colored sandy surface layer. The subsurface layer is light-colored, highly leached sand. Within a depth of 30 inches is a dark-colored organic pan underlain by acid sand.

Available water capacity is low in this soil. The water table normally is at a depth of 15 to 30 inches, but it rises to near the surface during the wet season. Permeability is rapid, and this soil normally can be drained without difficulty. The content of organic matter is medium. Natural fertility is low.

The native vegetation consists mainly of saw-palmettos, slash pines, and many shrubs and grasses. Many areas of this soil remain in native vegetation.

Because of periodic wetness and other poor soil properties, such as low fertility, this soil is severely limited for cultivated crops. Water control structures that are well designed, constructed, and maintained are needed to retain the water at a desired depth. Also needed is a cropping system that protects and improves the soil and adequate amounts of fertilizer and lime.

If intensive management practices are applied, this soil is suited to citrus. Areas used for citrus require bedding and drainage. Also needed is a water control system that provides deep drainage, control of the water table, and irrigation. Grass or cover crops should be grown to protect the beds, and large amounts of fertilizer and lime should be applied frequently.

High quality pastures consisting of improved grasses or of mixtures of grasses and clover can be produced under good management. A drainage system is needed for removing excess surface water. Large amounts of fertilizer and lime also are needed. In addition grazing must be controlled.

CAPABILITY UNIT IIIw-4

In this capability unit are nearly level, poorly drained to very poorly drained soils that are slightly acid to alkaline. These soils are in depressions and sloughs and in the broad flatwoods. They have a gray to black surface layer of fine sand, loamy fine sand, or fine sandy loam. The subsoil, at a depth of 10 to 40 inches, is loamy and is neutral to calcareous.

Available water capacity is moderately high in these soils. Normally these soils are saturated with water for long periods, but if outlets are available, they can be readily drained. Permeability is moderate to rapid. The content of organic matter is low to high, and base saturation is moderately low to high.

The native vegetation on these soils consists of waxmyrtle, pickerelweed, maidencane, St. Johnswort, many wetland grasses, and other plants. Much of the acreage remains in native vegetation, but a few large areas are used for improved pasture.

Excessive wetness severely limits use of these soils for cultivated crops. A system that removes excess surface water and regulates internal water is needed. Then special truck and flower crops can be grown. Citrus can be grown in areas of suitable size that are feasible to drain, but bedding is needed. In all cultivated areas cover crops are needed to improve the soil and provide protection from soil blowing and water erosion. All crops on these soils respond well if fertilizer and lime are applied in proper amounts.

High quality pastures consisting of improved grasses or of mixtures of grasses and clover can be produced under good management. A drainage system is needed that removes excess surface water and provides subsurface irrigation. Also needed are large amounts of fertilizer and small amounts of lime. In addition grazing must be controlled.

Some areas of these soils lack suitable drainage outlets. Others are near major streams and have a serious and frequent hazard of flooding. The soils in such areas normally have capabilities of soils in capability subclass Vw.

CAPABILITY UNIT IIIw-5

In this capability unit are nearly level, very poorly drained, deep, dark-colored soils. These sandy soils are in depressions, in broad lowlands, and along drainageways. They have a thick, dark-colored surface layer of fine sand. The subsurface layer is light-colored fine sand, and the subsoil is loamy or sandy and is at a depth below 40 inches.

Available water capacity is moderate in these sandy soils because of the content of organic matter in the surface layer. In their natural state these soils are either ponded or have a water table within a depth of 15 inches most of the year. The content of organic matter is high, and natural fertility is moderate to low.

The native vegetation in the depressions and broad lowlands is mainly pickerelweed, St. Johnswort, maidencane, sawgrass, and other grasses. It is bay, gum,

cypress, and other hardwoods that tolerate wetness in some of the drainageways. Large areas near Lake Okeechobee have been in pasture for many years. Most of these larger areas are suited to special cultivated crops, but none are now used for this purpose.

Excessive wetness severely limits use of these soils for cultivated crops. The high content of organic matter makes control of nitrogen difficult. A system that provides drainage and irrigation and that is well designed, constructed, and maintained is needed. Then these soils are well suited to leafy truck crops and flowers. A suitable cropping system is one that alternates cultivated crops with close-growing crops that protect and improve the soil. Adequate amounts of fertilizer and lime are also needed. The soils in this unit generally are not suited to citrus. The deep drainage and water control practices needed for citrus are difficult to establish and maintain on these soils.

Excellent pastures of improved grasses or of mixtures of grasses and clover can be produced on these soils under good management. A drainage system is needed that removes excess surface water and provides subsurface irrigation. Lime and fertilizer must be applied frequently, and grazing must be carefully controlled.

These soils were placed in this capability unit on the assumption that drainage outlets were available and that the soils could be drained readily. Soils that lack suitable outlets and would not be feasible to drain generally are placed in capability subclass Vw.

CAPABILITY UNIT IIIw-6

In this capability unit are nearly level, very poorly drained organic soils that are in depressions, swamps, and marshes. These organic soils are dark colored and have thin to thick layers of fibrous peat or muck underlain by sandy material.

Available water capacity is high in these soils, and permeability is rapid. These highly organic soils normally are covered with water. The content of nitrogen is high, but the supply of other plant nutrients is low.

The native vegetation in most areas consists of sawgrass, but pickerelweed, maidencane, and other aquatic grasses and plants grow in places. Also, cypress and swamp hardwoods grow in some areas. Most areas remain in native vegetation, but some are used for improved pasture.

Excessive wetness severely limits use of these soils for cultivated crops. If these soils are properly drained, however, and if proper water control measures are applied, they are well suited to special cultivated crops. After drainage and the initial subsidence caused by compaction, subsidence by oxidation is a continual hazard. Structures therefore are needed that hold the water level at the proper depth for crops and that permit flooding the soils when left idle. Cover crops also should be grown. In addition large amounts of fertilizer that is high in all plant nutrients except nitrogen should be applied frequently. Lime is needed on the more acid soils.

These soils are not suited to citrus. They have many soil properties unfavorable to citrus trees, and the drainage requirements of this crop cause rapid soil deterioration.

High quality pastures consisting of improved grasses or of mixtures of grasses and clover can be produced under intensive management. A drainage system is needed for removing excess surface water and for maintaining the water table at a shallow depth. Fertilizer and lime should be applied where needed. In addition grazing must be controlled.

These soils were placed in this capability unit on the assumption that drainage outlets were available and reclamation was feasible. Small isolated areas of these soils in dense woods and remote areas where no drainage outlets are available generally are placed in capability subclass VIIw.

CAPABILITY UNIT IIIs-1

This capability unit consists of nearly level to gently sloping, moderately well drained to somewhat poorly drained soils on low knolls and ridges in the flatwoods. The surface layer is thin, dark-gray fine sand. In some areas the soils have a brownish layer underlain at a shallow depth by a light-colored sandy substratum. In other areas the soils have a white sandy subsoil underlain by black mucky sand at a depth of about 36 inches.

These soils have low available water capacity, are rapidly permeable, and are highly leached. The water table is normally at a depth between 48 and 60 inches, though it fluctuates between a depth of 30 and 72 inches. The content of organic matter is low, and natural fertility also is low.

The native vegetation consists of slash pines, sand pines, saw-palmettos, several kinds of oak, and many woody shrubs and grasses. Most of the acreage in this unit remains in native vegetation.

Poor soil properties make these soils severely limited for growing cultivated crops. Under intensive management that includes sprinkler irrigation, a few special crops can be grown, and some small areas are in citrus fruits and improved pastures. The cropping system should include soil building crops or pasture grasses for 2 out of 3 years. Large amounts of fertilizer and lime are also needed and should be applied frequently.

Because these soils have adequate natural drainage, they are well suited to citrus fruits (fig. 9). Sprinkler irrigation is needed, especially for newly established groves, but bedding is not required. Keeping cover crops or grass on the areas improves the surface soil and protects it from soil blowing. Frequent applications of fertilizer and lime are needed.

Improved pasture consisting of deep-rooted grasses can be produced on these soils because such grasses can use the available moisture in the subsoil. Growth of pasture plants is good if they are properly established and if sufficient fertilizer and lime are applied. In addition, grazing must be controlled.

CAPABILITY UNIT IVw-1

In this capability unit are nearly level, somewhat poorly drained soils that are medium acid to neutral. These soils are in the flatwoods. The surface layer is thin, dark-colored fine sand, and the subsurface layer is light-colored fine sand. The subsoil is either loamy and calcareous marl or is deep sand.

These soils have low available water capacity. The water table normally is at a depth of about 30 inches, but it rises to the surface for brief periods during the

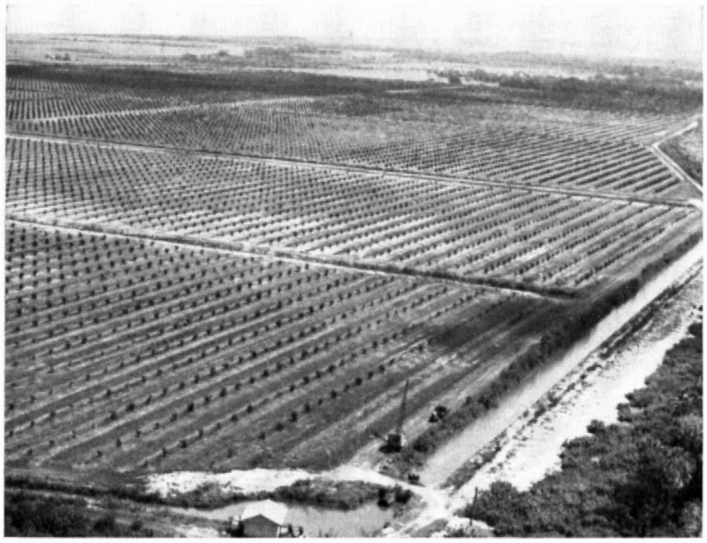

Figure 9.—**Young orange grove planted on soils in capability unit IIIs–1.**

wet season. During the dry season the soils are droughty. Mineral fertilizers leach rapidly from these soils. The content of organic matter and natural fertility are low.

The native vegetation consists of saw-palmettos, scattered pines and cabbage-palms, and various kinds of grasses. Hardwoods are dominant in small areas near Lake Okeechobee. Most areas of these soils remain in native vegetation.

Because of periodic wetness and other poor soil qualities, these soils are very severely limited for cultivated crops. A system that provides drainage and irrigation by controlling the water table is needed. Then special truck and flower crops can be grown. Citrus also can be grown, but the areas will require bedding. If cultivated crops are grown, the cropping system should include sod crops and crops that improve the soil 3 years out of 4. If citrus is grown, cover crops are needed to protect the beds and improve the soil. Both cultivated crops and citrus require large amounts of a complete fertilizer. Small amounts of lime are needed for cultivated crops, and moderate amounts are needed for citrus.

High quality pastures consisting of improved grasses can be produced on these soils. A drainage system is needed for removing excess surface water. Large amounts of a complete fertilizer are needed, and moderate amounts of lime. Pastures of grasses and clover require supplemental irrigation and controlled grazing for good growth.

CAPABILITY UNIT IVw–2

This capability unit consists of nearly level, poorly drained soils. These soils are in the flatwoods. They have a thin, dark-colored surface layer of fine sand and a nearly white, leached subsurface layer of fine sand. A weakly cemented organic pan generally is at a depth between 20 and 40 inches.

These soils have low available water capacity and are rapidly permeable. The water table fluctuates within the soil but rises to the surface in the wet season. In their natural state these soils are droughty in the dry season and saturated with water in the wet season. If mineral fertilizer is applied, it leaches out rapidly. Content of organic matter and natural fertility are low.

The native vegetation consists of pines that have an understory of saw-palmettos and of many kinds of native grasses and shrubs. Most areas of these soils are used for improved pasture. Pine trees have been harvested on most other areas and the remaining vegetation is chiefly palmettos and grasses, but a few pines are scattered over the areas.

Use of these soils for cultivated crops is very severely limited by periodic wetness and other poor soil qualities. Certain truck and flower crops can be grown, however, under intensive management. A system that provides drainage and irrigation by controlling the water table is needed. Grasses or other crops that protect and improve the soil should be grown three-fourths of the time. In addition large amounts of lime and fertilizer must be applied frequently.

These soils are severely limited for citrus. Adequate measures for control of water are difficult to maintain because the water table fluctuates widely between the wet and dry seasons. Fertility also is difficult to maintain because these soils are very sandy.

High quality pastures consisting of improved grasses or of mixtures of grasses and clover can be produced under intensive management. A system is needed for water control that is similar to that needed for cultivated crops, but not so intensive. Large amounts of fertilizer and lime also are needed. Grazing must be carefully controlled.

CAPABILITY UNIT IVw–3

In this capability unit are nearly level, poorly drained soils that are very strongly acid to neutral. These soils are in grassy sloughs. The surface layer is thin, dark-colored fine sand. It overlies light-colored fine sand that extends to a depth of more than 60 inches.

Although these soils are seasonally wet, available water capacity is low and the soils are droughty during dry seasons. The water table normally is at a depth of about 20 inches, but it rises to the surface during wet seasons. If mineral fertilizer is applied, it leaches out rapidly. Permeability is rapid. Content of organic matter and natural fertility are low.

The native vegetation on these soils consists chiefly of grasses, sedges, and low-growing shrubs. Most areas remain in native vegetation and are used for native range. Several large areas, however, are in improved pastures.

Use of these soils for cultivated crops is severely limited by excessive wetness and other poor soil properties. Some truck and flower crops can be grown, however, under intensive management. A water control system is needed that provides subsurface irrigation by controlling the water table. The cropping system used should include crops that protect and improve the soil. Large amounts of fertilizer and lime also are needed.

These soils are severely limited for citrus. Their low position on the landscape and the normally high water table make water control difficult. Also natural fertility is low and fertility is difficult to maintain in these sandy soils.

Good pastures consisting of improved grasses or mixtures of grasses and clover can be produced under intensive management. A system is needed for water control that is similar to that required for cultivated crops but is not so intensive. Large amounts of lime and fertilizer also are needed. Grazing must be carefully controlled.

These soils were placed in this capability unit on the assumption that drainage outlets were available and the soils could be drained readily. Areas that lack suitable drainage outlets and normally are not feasible to drain generally are placed in capability subclass Vw.

CAPABILITY UNIT Vw-1

In this capability unit are nearly level, very poorly drained, deep, sandy soils in depressions. These soils are covered with several inches of water most of the time. Most of these soils have a thin, light-colored surface layer, but some have a thick, dark-colored surface layer.

Most of these soils have low available water capacity and are highly leached of plant nutrients. Permeability is rapid throughout. Content of organic matter is low.

The native vegetation consists of St. Johnswort, pickerelweed, maidencane, and other grasses and sedges that tolerate wetness. Sawgrass grows in some areas. Most areas remain in native vegetation.

Because these soils are continuously wet and lack adequate available drainage outlets, they are not suitable for cultivated crops. Water management is difficult to apply. In many areas these soils have physical properties that are similar to those of soils in capability units IIIw-4, IIIw-5, and IVw-3, but poor drainage makes them unsuitable for crops. In a few places it is feasible to establish adequate water control, and here management suitable for soils in capability units IIIw-4, IIIw-5, and IVw-3 can be applied.

Most areas of this unit are used for native range. Grazing must be controlled for good growth of native grasses. Trees are not suited. Soils in this unit provide a natural feeding ground for many kinds of aquatic birds and animals. In its natural state, this unit also serves as watering areas for livestock.

CAPABILITY UNIT VIs-1

Pomello fine sand is the only soil in this capability unit. It is a deep, nearly level, moderately well drained soil that is very strongly acid. It has a thin surface layer of gray fine sand and a thick, white, highly leached subsurface layer. An organic pan occurs at a depth below 30 inches.

This soil has low available water capacity and is droughty much of the time. The water table normally is at a depth of 48 to 60 inches, but it rises to about 30 inches during the wet season. Permeability is rapid. If mineral fertilizer is applied, it leaches out rapidly. Fertility and content of organic matter are very low.

The native vegetation consists chiefly of saw-palmettos and woody shrubs and grasses, but includes scattered stands of slash and sand pines. Most areas remain in native vegetation.

This soil is not suitable for cultivated crops and citrus. Even under intensive management, this soil is too droughty and leaches too readily for good growth of these crops.

Under intensive management improved pastures of fair quality can be produced on this soil. Deep-rooted grasses that resist drought should be planted. In addition large amounts of fertilizer and lime must be applied frequently. Grazing should be delayed during initial development, and it should be controlled carefully thereafter.

CAPABILITY UNIT VIIw-1

The one mapping unit in this capability unit is Placid, Pamlico, and Delray soils, ponded. These are nearly level, very poorly drained soils in swamps and along heavily wooded drainageways. In these areas are deep, sandy soils that have a thick dark-colored surface layer, and organic soils that have a muck or peat surface layer 12 to 36 inches thick. They are covered by water most of the time or are subject to frequent stream flooding.

These soils have moderate to high available water capacity and are rapidly permeable. They are high in content of organic matter and low to moderate in natural fertility.

The native vegetation consists mostly of dense stands of sweetbay, sweetgum, cypress, and water oak that have an understory of brackenfern, sawgrass, and other plants that tolerate wetness. Most areas of this unit remain in native vegetation.

Because of wetness and the hazard of flooding, these soils are poorly suited to cultivated crops and use for improved pasture is very limited. Clearing the land and providing adequate drainage and flood control generally are too expensive and complex to be feasible. These soils are well suited to trees, and under good management, cypress and wetland hardwoods grow well. Forested areas also provide food and shelter for many kinds of wildlife.

Estimated Yields

Table 2 gives the estimated average acre yields of the principal crops grown in the county. These estimates are those that can be expected under a generally high level of management. The land types Borrow pits (Bo), Made land (Ma), and Spoil banks (Sp) are not listed on table 2 because they are too variable in characteristics to be used for crops.

On cropland a high level of management includes applying adequate amounts of fertilizer and lime; controlling insects; managing crop residues properly; supplying drainage where needed; controlling runoff and erosion; and installing irrigation systems that are properly designed. On pastureland a high level of management includes using adequate amounts of fertilizer and lime; practicing controlled grazing; rotating pasture; selecting forage varieties that are best adapted to the soils; controlling undesirable plants; providing drainage to remove excess surface water; and providing irrigation where feasible.

The yields in table 2 are based on information obtained from observations made by members of the soil survey party, from interviews with farmers and other workers who have had experience with the soils and crops of the area, from records and experience of the local work unit conservationists, and from bulletins and other information compiled by the University of Florida Agri-

TABLE 2.—*Estimated average acre yields of principal crops*

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the crop is not suited to the specified soil or generally is not grown on it]

Soil name	Tomatoes	Water-melons	Oranges	Grape-fruit	Improved pasture	
					Grass	Grass-clover
	40-pound boxes	*Pounds*	*Boxes*	*Boxes*	*Animal-unit-months* [1]	*Animal-unit-months* [1]
Adamsville fine sand	350	25, 000	250	350	7. 0	9. 0
Basinger fine sand	250	20, 000	----------	----------	6. 3	8. 5
Basinger-Placid complex	250	----------	----------	----------	5. 6	8. 3
Basinger and Pompano fine sands, ponded	250	----------	----------	----------	5. 6	8. 3
Bradenton fine sand	350	20, 000	425	500	8. 3	9. 0
Charlotte fine sand	400	25, 000	224	300	7. 0	10. 0
Chobee fine sandy loam	----------	----------	425	500	9. 0	10. 5
Delray fine sand	250	----------	400	450	9. 0	11. 0
Delray fine sand, thin solum variant	250	----------	400	450	9. 0	11. 0
Elred fine sand	350	22, 000	425	500	8. 3	10. 0
Felda fine sand	350	22, 000	425	500	8. 3	10. 0
Felda, Pompano, and Placid soils, ponded	300	----------	----------	----------	7. 0	8. 3
Ft. Drum fine sand	325	22, 000	350	450	7. 0	10. 0
Immokalee fine sand	300	20, 000	240	400	7. 0	10. 0
Manatee loamy fine sand	300	----------	425	500	9. 0	11. 0
Manatee, Delray, and Okeelanta soils	----------	----------	----------	----------	9. 0	11. 0
Myakka fine sand	300	20, 000	240	400	7. 0	10. 0
Okeelanta peat	----------	----------	----------	----------	10. 0	12. 0
Paola fine sand	300	25, 000	400	450	7. 0	----------
Pamlico muck	----------	----------	----------	----------	10. 5	12. 0
Parkwood fine sand	250	18, 000	425	500	8. 3	10. 5
Placid fine sand	200	----------	----------	----------	8. 5	10. 5
Placid, Pamlico, and Delray soils, ponded	----------	----------	----------	----------	8. 3	10. 5
Pomello fine sand	----------	----------	----------	----------	5. 6	----------
Pompano fine sand	350	25, 000	250	300	7. 0	9. 0
Seewee fine sand	----------	----------	250	350	7. 0	9. 0
St. Johns sand	200	20, 000	250	400	8. 5	10. 0
Terra Ceia peat	----------	----------	----------	----------	10. 5	12. 0
Wabasso fine sand	300	20, 000	350	450	8. 3	10. 0

[1] Animal-unit-months refers to the number of months during a normal growing season that 1 acre will provide grazing for an animal unit (1 cow, horse, or steer; 5 hogs, or 7 sheep) without injury to the sod.

cultural Experiment Stations. They also are based on comparisons of yields on similar soils in other counties in the southern part of Florida, and from records of crop yields kept by the Florida Crop Reporting Service. The yield estimates assume optimum weather conditions.

Use of the Soils for Range [4]

Broad expanses of nearly level flatwoods, marshes, and sloughs cover Okeechobee County and provide grazing both for domestic livestock and wildlife. About three-fourths of the acreage in the county produces native forage.

Native grasses have been an important source of forage to this area since the early days of the cattle industry. Today livestock on ranches still depend on native grasses for much of their forage. These grasses are readily available and can be cheaply grown. Used in a seasonal rotation along with improved pastures and modern animal husbandry practices, native grasses are important in the total forage program.

[4] LEWIS L. YARLETT, range conservationist, Soil Conservation Service, assisted in the preparation of this section.

Range sites and range conditions

Range sites are distinctive kinds of rangeland or woodland used for grazing; they differ from each other significantly in the kinds and amounts of climax vegetation they produce. A significant difference means one large enough to require different management. The combined effects of soil and climate result in significantly different kinds and quality of vegetation. The effect of shading on wooded sites is also a distinguishing factor.

The vegetation that grew originally on a site is called the *climax vegetation*. It is generally the most productive and most suitable for that particular site, and it reproduces itself as long as the environment does not change. The climax vegetation consists mainly of three kinds of plants—*decreasers*, *increasers*, and *invaders*.

Decreasers are the most palatable climax plants, and they are eliminated rather quickly by continual heavy grazing. Two examples of decreasers are creeping bluestem on the Flatwoods range site and maidencane on the Fresh Marsh range site.

Increasers are plants that are less palatable to livestock. They increase for awhile under heavy grazing but finally go out under continual heavy use. They generally are less productive than decreasers. Broomsedge blue-

stem is an example of a common increaser in the Flatwoods range site.

Invaders are plants of little value for forage, but they become established after the other vegetation has been reduced. They may be annuals or perennials and most often are unpalatable. Examples of invaders are bottlebrush three-awn, carpetgrass, and annual "watergrasses" on the Flatwoods range site, and broadleaf carpetgrass in the Fresh Marsh range site.

Range condition is the present state of the vegetation in relation to the climax plants on the site. The purpose of the condition class is to provide an approximate measure of any change that has taken place in the plant cover. Thus, the condition classes are a basis for measuring production or need for conservation treatment. The four condition classes in Okeechobee County are excellent, good, fair, and poor.

A range on a woodland understory in excellent condition has 76 to 100 percent, by weight, of the climax vegetation; one in good condition, 51 to 75 percent; one in fair condition, 26 to 50 percent; and one in poor condition, less than 25 percent.

The amount of light received during the growing season influences both the quantity and quality of woodland forage. For this reason, four canopy classes have been established to take the light factor into account. Canopy classes are determined by the percent of the ground shaded by overstory. They are as follows:

Overstory canopy classes:	*Percent of shaded ground at midday*
Open	0 to 25
Sparse	26 to 50
Medium	51 to 75
Dense	76 to 100

Descriptions of range sites

The soils in Okeechobee County have been grouped into nine range sites described in the following pages. On five of these sites the climax potential is trees. The description of each range site gives the important characteristics of the soils and the names of the principal grasses or other forage plants.

ACID FLATWOODS RANGE SITE

This range site consists of nearly level, strongly acid, deep, sandy soils that are poorly drained. These soils have a thin surface layer of dark-gray sand; subsurface layer of nearly white sand; and a dark-colored layer stained with organic material within a depth of 48 inches. The water table fluctuates within the soil but rises to the surface during wet seasons.

The acid flatwoods occupy a large area that originally supported an open forest of slash pine and longleaf pine. This area was cleared and large parts are now treeless. Because the canopy of the original forest was open, the understory consisted of range plants (fig. 10).

About 60 percent of the climax vegetation now is decreaser and increaser grasses, such as creeping bluestem, lopside indiangrass, chalky bluestem, blue maidencane, tall paspalum, and Florida three-awn. Desirable forbs are deertongue, swamp sunflower, grassleaf goldaster, milkpea, and peavine. Saw-palmettos and gallberries were part of the original understory in small quantity,

Figure 10.—**Typical open growth of young south Florida slash pine on Myakka fine sand in the Acid Flatwoods range site. Saw-palmettos and many kinds of native grasses make up the dense undergrowth.**

but they have increased and now dominate much of this site. Desirable woody plants are tarbush, huckleberry, and runner oak.

The potential understory forage during dry years and in years when rainfall is about average in pounds per acre air-dried, by canopy class is:

Canopy class:	*Dry years*	*Average years*
Open	3, 000	4, 000
Sparse	1, 000	3, 000
Medium	500	1, 000
Dense	0	500

EVERGLADES MARSH RANGE SITE

In this range site are nearly level, slightly acid to mildly alkaline, shallow to deep, fibrous peats that overlie sandy material. They occupy small to large, ponded shallow basins that are scattered throughout the county. The areas are covered by shallow water throughout most of the year.

The soils of this site support a nearly pure stand of sawgrass (fig. 11). This plant is a giant sedge that has sawtooth edges. It occurs in pure and vigorous stands that exclude all other kinds of plants. Little, if any, grazing is done on this plant. In some places freshly burned sawgrass is grazed, but only as emergency forage.

The potential forage production was not determined for these soils.

FRESH MARSH RANGE SITE

Only the mapping unit Manatee, Delray, and Okeelanta soils is in this range site. These low-lying soils are nearly level and very poorly drained The surface layer generally is high in content of organic matter, but it is less than 12 inches thick over a mineral subsoil. These

Figure 11.—**Dense stand of sawgrass on Okeelanta peat in Everglades Marsh range site. In the background is a dense growth of cabbage-palms on Parkwood soils in the Hammock range site.**

soils are covered by water during wet seasons and remain wet throughout the rest of the year.

Decreasers and increasers make up about 80 percent of the climax vegetation on this range site. This vegetation consists of maidencane, cutgrass, beaked panicum, sand cordgrass, and perennial sedges and rushes. Invaders that dominate under continued heavy grazing include annuals; pickerelweed, redroot, smartweed, iris, and broadleaf carpetgrass.

The potential forage production, in pounds per acre air-dried, ranges from 6,000 to 6,600 pounds in dry years and from 8,000 to 8,800 pounds in wet years.

HAMMOCK RANGE SITE

In this range site are nearly level to gently sloping, poorly drained to moderately well drained sandy soils that are acid to neutral. Areas of this site that occur in marshes, swamps, or sloughs occupy islands slightly higher than the surrounding areas. Areas in the flatwoods are slightly lower than surrounding areas or are in areas where the soils are more fertile than those that surround them.

The climax vegetation on this site is chiefly palms and hardwoods. The hammocks generally are small and occur within areas of the Acid Flatwoods, Sweet Flatwoods, and Slough range sites. The undergrowth of shrubs and vines is dense, and grasses cover the small open areas. Differences in the kinds of plants and in productivity vary only slightly from one area to another. Because of the dense canopy in most hammock sites, the quantity of forage produced is small, though it generally is of high quality. This site is used mostly to provide shade, shelter, and browse for livestock.

Dominant trees on this site include cabbage-palm, live oak, magnolia, strangler fig, sweetbay, persimmon, and slash pine. Major shrubs are holly, waxmyrtle, saw brier, Virginia creeper, and French mulberry. Decreaser vegetation includes eastern gamagrass, beaked panicum, bluestem, longleaf uniola, and low panicum.

The potential understory forage production was not determined for this range site.

SAND POND RANGE SITE

In this range site are nearly level, strongly acid to neutral soils that are poorly drained to very poorly drained. Some of these soils have a sandy surface layer underlain by finer textured material. The dominant soils, however, consist of deep, light-colored fine sands in sand ponds. Toward the center of areas of these sand ponds, the soils have a thick, dark-colored, highly organic surface layer and are more fertile than the lighter colored sands. Areas of this range site occur in places throughout both the Acid Flatwoods and Sweet Flatwoods range sites.

Areas of this range site generally occupy basins that range from one acre to about 50 acres in size. The original vegetation was chiefly maidencane (fig. 12), and because of this, local residents often refer to areas of this site as grassy ponds.

Three or four kinds of vegetation occur in the grassy ponds in circular bands, the kind depending upon the soils and the depth of the water. A small area of peat may occur in the center of some ponds. The kinds of plants that grow vary from one pond to another, depending mostly upon the organic content of the soil and the fluctuating seasonal water level. On some of the more sandy soils, the vegetation consists of longleaf three-awn and broomsedge and of small amounts of maidencane. Plants that invade if the site is overgrazed are sand cordgrass, low panicum, carpetgrass, annual weeds, and the woody shrub, St. Johnswort. The potential forage production was not determined for this range site.

SAND SCRUB RANGE SITE

In this range site are nearly level, moderately well drained, deep fine sands that are very strongly acid. These droughty soils have a thin, gray surface layer.

Figure 12.—**Good stand of maidencane on soils of the Basinger-Placid complex in the Sand Pond range site. A small area of pickerelweed is in the center of the pond.**

Just below is either a brown stained layer, underlain by a light-colored subsoil, or a nearly white layer, underlain by a dark-colored organic pan at a depth of more than 30 inches. The water table normally is at a depth of 48 to 60 inches.

The climax vegetation on this site consists of sand pine, sand and scrub hickories, and scattered areas of turkey and bluejack oaks. Runner oak, saw-palmetto, yucca, pricklypear, and rosemary make up the understory. Grasses common on this site include pineland three-awn, broomsedge, bluestem, and small amounts of low panicum and dropseed.

The potential understory forage production was not determined for this site.

SLOUGH RANGE SITE

This range site consists of nearly level, strongly acid to neutral, moderately deep to deep, sandy soils that are poorly drained. In most areas soils consist of deep, light-colored fine sand. Small areas, however, are made up of soils that have a thick, dark surface layer underlain by heavier material within a depth of 30 inches. This site is covered by a few inches of slowly moving water during wet seasons, and the soils are wet most of the year.

Saw-palmettos, common to adjacent flatwoods areas, rarely occur on this site. Many kinds of decreaser and increaser grasses are common in various stages of plant succession. These plants include toothachegrass, blue maidencane, hairy bluestem, bluejoint panicum, and Florida and pineland three-awns. Many species of perennial sedges and rushes are part of the climax vegetation. These include striped and globe beak-rushes, razorsedge, and whitetop sedge.

The potential forage production, in pounds per acre air-dried, ranges from 1,000 to 1,800 pounds in dry years and from 1,800 to 3,500 pounds in wet years.

SWAMP RANGE SITE

In this range site are nearly level, acid to neutral, deep, dark-colored soils that are very poorly drained. These soils occupy densely wooded depressions and drainageways in isolated, small to large, ponded areas. Some of the soils in this site are sandy and have a thick, dark surface layer and a sandy or loamy subsoil. Others consist of layers of muck or peat as much as 36 inches thick over a sandy subsoil. The areas are under standing or very slowly moving water throughout most of the year.

The swamps that make up this range site generally have a dense canopy of trees on them that tolerate wetness. Some of the stands are made up of one tree, such as cypress, and others consist of mixtures of many kinds of trees. The dominant trees are baldcypress, pondcypress, and several species of gum, sweetbay, water elm, swamp ash, and swamp maple. The undergrowth includes such plants as pondapple, waxmyrtle, storax, lizardtail, pickerelweed, water hyacinth, and brackenfern. Because of the high water level, only small amounts of forage are produced in summer. In winter browse and some grass provide grazing for livestock, especially in the borders of the swamp.

The potential understory forage production was not determined for the soils in this site.

SWEET FLATWOODS RANGE CITE

This range site consists of nearly level, slightly acid to neutral soils that are somewhat poorly drained to poorly drained. These soils have a thin, dark-gray surface layer of fine sand; a lighter colored subsurface layer of sand; and a neutral to calcareous sandy or loamy subsoil. The water table fluctuates within these soils but rises to the surface during wet seasons.

Scattered cabbage-palms and live oaks are common on this site (fig. 13). This site originally supported an open forest of slash and longleaf pines. An open canopy permitted growth of an understory of range plants. About 70 percent of the climax vegetation now on this site is such decreasers and increasers as creeping bluestem, Florida paspalum, lobsided indiangrass, switchgrass, and Florida three-awn. Desirable forbs are beggarweed, grassleaf goldaster, milkpea, and peavine. Desirable woody shrubs are dwarf myrtle, holly, runner oak, huckleberry, and tarbush.

The potential understory forage during dry years and in years when rainfall is about average in pounds per acre, air-dried, by canopy class is:

Canopy class:	*Dry years*	*Average years*
Open	4, 000	5, 000
Sparse	2, 000	4, 000
Medium	1, 000	2, 000
Dense	0	1, 000

Use of the Soils for Woodland [5]

This section gives suggestions about management of woodland. It also discusses the potential productivity and limitations of the soils for wood crops.

About 30 percent, or 148,688 acres, of Okeechobee County was in trees of commercial value in 1964. Most of this acreage was in private ownership. Pine trees

[5] By Edward D. Holcombe, woodland conservationist, Soil Conservation Service.

Figure 13.—**Scattered cabbage-palms within an open growth of pine trees grown on Wabasso fine sand in the Sweet Flatwoods range site.**

Figure 14.—**South Florida slash pine on Immokalee fine sand. Young trees are in the foreground and tall, mature parent trees are in the background.**

originally covered much of the county, but these were cut for lumber about 50 years ago.

Much of the present woodland consists of second-growth pine (fig. 14), which is now being harvested. Some of the stands are dense, but most consist of scattered trees in open areas. Hardwoods and cypress grow in places, but these trees are of poor commercial quality. Pulpwood cut in the pine woods is loaded on flatcars at Okeechobee and shipped to mills in northern Florida. No sawmills are in this county.

Clear cutting, wildfire, and other factors have greatly reduced the number of merchantable trees. Much of the open woodland is used for grazing cattle, which further limits the growth of trees. Under good management that includes control of grazing, interplanting, and control of fire, trees of commercial value can be encouraged to grow in these open areas.

General woodland management

One of the primary functions of good woodland management is to protect the soil. A properly managed stand of trees can do much to prevent soil deterioration and to insure proper conservation of soil and water resources. Trees slow the force of rainfall and, thus, the surface soil is able to absorb more moisture. Litter from the trees also lessens the force of raindrops and helps to hold the soil in place.

Proper management of woodland is necessary so that trees can do their part in conserving soil and water. The minimum practices are discussed in the paragraphs that follow.

Fire protection.—Wildfires destroy trees and ground cover. They lessen the ability of the soil to absorb moisture and consume the litter that helps to replenish the supply of organic matter in the soil. Fires also slow the growth of trees not killed and cause wounds that provide an entry for insects and diseases.

The Florida Forest Service provides fire protection to the entire county. Individual landowners, however, can help by observing all rules of fire prevention. Landowners can also construct and maintain adequate firebreaks around and through their woodland. Because these firebreaks can slow or stop a wildfire under normal conditions, they give good protection to the woodland. Care should be taken to provide protection against erosion when constructing these firebreaks. Controlled or prescribed burning should only be done with the approval and guidance of qualified Florida Forest Service personnel.

Water management.—Management of water in woodland is an important factor in starting and maintaining normal growth of pine trees. Most of the soils in the county are nearly level and have a fairly high water table. Practices therefore are needed for control of excess surface water and an abnormally high water table. A properly designed system of shallow ditches that removes excess water should be installed. Such a drainage system would tie in all ponded areas and provide a suitable outlet. Establishing new plantings on low beds or ridges above the water table help to obtain optimum root development.

Tree planting.—Most woodland in the county is understocked. Since trees are crops, tree farming is an accepted operation just as any other phase of farming. Trees can be planted and grow well under a wide variety of soil conditions. In this county pine trees are particularly suited because they are native to most of the soils. Owners of idle land or of understocked woodland should consider planting the areas to trees.

Proper cutting practices.—Regulated cutting of woodland will provide adequate protection of the soil and still bring economic gain to the landowner. Practices needed vary as the condition of the woodland varies. The landowner, however, can seek professional advice from the district conservationist of the Soil Conservation Service or from the farm forester of the Florida Forest Service.

Woodland suitability groups

The soils of Okeechobee County have been placed in eight woodland groups to help landowners in planning the proper use and management of their woodlands. Each group consists of soils that have about the same potential productivity and that need similar management. These groups are listed in table 3. The names of the soils in each group can be found in the "Guide to Mapping Units" at the back of this survey.

Suitability of the soils for various kinds of trees is based on soil characteristics that affect growth, survival, and general vigor of the trees. Among the soil features considered were ability of the soil to retain moisture and depth of the root zone. Other factors are thickness and texture of the surface layer, content of organic matter, depth to fine-textured material, aeration of the soil, and depth to the water table.

Some soils, and especially those in low areas and along streams, are suited to hardwoods. Hardwoods are not listed in table 3, but they could be grown in many areas. A local forester should be consulted, however, before planting large areas to hardwoods.

TABLE 3.—*Woodland groups, average site indexes, and yearly growth per acre of important trees*

[Not included in this table because of their variable characteristics are the land types Borrow pits (Bo), Made land (Ma), and Spoil banks (Sp)]

Woodland groups and soil symbols	Species preferred for planting	Species to favor in existing stands	Important trees	Average site index	Yearly growth rate per acre	Principal hazards and limitations
					Cords	
Group 1: Moderately well drained, deep sands that have a water table normally at a depth of 48 to 72 inches: Pd, Pm, Se.	Slash pine [1]	Longleaf pine	Slash pine Longleaf pine	80 70	1.5–1.7 .8–1.1	Release of pine seedlings from unwanted trees and shrubs may be needed to assure good growth and stand development; severe dryness increases seedling mortality.
Group 2: Somewhat poorly drained, deep, neutral to alkaline sands that have a water table normally at a depth of 12 to 36 inches: Ad, Fr.	Slash pine	Longleaf pine, South Florida slash pine.	Slash pine South Florida slash pine. Longleaf pine	80 60 70	1.5–1.7 .9–1.2 .8–1.1	Established pine seedlings must be released from unwanted vegetation; high water table restricts root zone; windthrow may occur following heavy intermediate cuttings; soil wetness may restrict logging or planting operations 3 to 4 months per year.
Group 3: Poorly drained soils that have a sandy surface layer and a moderately permeable, loamy subsoil: Br, Wa.	Slash pine	Longleaf pine, South Florida slash pine.	Slash pine South Florida slash pine. Longleaf pine	80 60 70	1.5–1.7 .9–1.2 .8–1.1	Planting or seeding can be done with reasonable results; release from competing vegetation may be needed after establishment; wetness is a hazard most of the year; damage from compacting may occur; drainage is needed in places to assure normal growth.
Group 4: Poorly drained, deep, light-colored, acid sands over an organic pan that have a water table normally at a depth of 12 to 36 inches: Im, My, St.	Slash pine	Longleaf pine, South Florida slash pine.	Slash pine South Florida slash pine. Longleaf pine	80 60 60	1.5–1.7 .9–1.2 .5–.8	Established pine seedlings must be released from unwanted vegetation; high water table restricts root zone; windthrow may occur following heavy intermediate cuttings; soil wetness may restrict logging or planting operations 3 to 4 months per year.
Group 5: Poorly drained to very poorly drained, sandy to loamy soils that have a moderately to slowly permeable, slightly acid to alkaline subsoil and a calcareous substratum: Co, Mc, Mo.	Slash pine	South Florida slash pine.	Slash pine South Florida slash pine.	75 60	1.3–1.6	Plant competition is severe, and site preparation is needed before planting; drainage is needed for normal growth; seedling mortality may be severe; root zone restricted.
Group 6: Poorly drained, sandy soils that are shallow to marl: Pe.	Slash pine	South Florida slash pine.	Slash pine South Florida slash pine.	75 60	.9–1.2	Site preparation is needed; seedling mortality is high in wet seasons; seasonal flooding of soils may occur; windthrow is a hazard in places.

See footnote at end of table.

TABLE 3.—*Woodland groups, average site indexes, and yearly growth per acre of important trees*—Continued

Woodland groups and soil symbols	Species preferred for planting	Species to favor in existing stands	Important trees	Average site index	Yearly growth rate per acre	Principal hazards and limitations
					Cords	
Group 7: Poorly drained to very poorly drained, deep sandy soils that have leached, rapidly permeable sandy layers to more than 20 inches deep: Ba, Bc, Bm, Ch, De, Dt, Ef, Ff, Fp, Pf, Ph, Pn.	Slash pine	South Florida slash pine.	Slash pine South Florida slash pine.	75 60	1. 6–1. 8 1. 0–1. 3	Water control is needed for best growth of pines; high water table most of the year; competition from undesirable vegetation is severe; wetness restricts use of equipment most of the year.
Group 8: Very poorly drained organic soils: Oe, Pa, Tc.						Permanently wet, mostly organic soils that are not suited to pine tree production.

[1] The name "slash pine" refers to slash pine (typical) (*Pinus elliottii* var. *elliottii*.).

The amount of a given wood crop that a given soil can produce under a specified level of management is expressed as a site index. A site index is the average height, in feet, that the best (dominant and codominant) trees of a given species, growing on a specified soil, will reach in 50 years. The site index is not a direct indicator of potential productivity of a soil, but the higher the site index, the greater the yields of commercial timber. The site index is the criterion least affected by drought, fire, insects, disease, and other factors that restrict the development and productivity of trees.

The site indexes for slash pine, longleaf pine, and South Florida slash pine were converted to total merchantable volume in standard cords, in table 3. A standard cord is 128 cubic feet per acre. These conversions were made by reference to public research material on growth of pines (*5*).

Use of the Soils for Wildlife [6]

The kind and number of wildlife within an area are influenced by the number of soils in the area. Basically, the capability of the soils to produce desirable food and cover determines the suitability of an area for different kinds of wildlife.

In addition to the characteristics of the soils, topography, farm development, size of natural habitats, and presence of open water also determine wildlife populations.

Since Okeechobee County is still largely undeveloped, many kinds of wildlife live in the area. Each kind of wildlife inhabits several different soil areas in feeding, nesting, and seeking shelter. It can therefore be assumed that all of the soils are suited to and support one or more kinds of wildlife. The main kinds of wildlife in the county are turkey, deer, bobwhite quail, mourning doves, gray squirrels, and wild ducks. Many raccoons and a few gray fox and wild hogs also are present.

Many soil and water conservation practices are suitable for managing the various areas of the county for wildlife and fish. Important among these are control of brush and weeds, development of the habitat for specific wildlife, and controlling burning. Also important are development of farm ponds, control of aquatic weeds, proper stocking of the ponds with fish, and development of wetland areas.

The district conservationist of the Soil Conservation Service maintains up-to-date technical guides on important kinds of wildlife and fish, as well as on plants suitable for food and cover. He can help the farmer plan good habitats for wildlife suited to his land.

Food and cover for wildlife

Following is a summary of the food and habitat needs of the important kinds of wildlife in the county.

Turkey.—The wild turkey inhabits the Placid and Pamlico soils in the swamps, the Myakka and Immokalee soils in the flatwoods, and the Parkwood soils in the hammocks. They need water daily. In the swamps turkeys roost in the larger trees. Here choice foods are various kinds of tree seeds and the understory plants in small open areas. In the open flatwoods turkeys feed on palmettos, gallberries, grass seeds, and acorns of runner oak. Turkeys obtain some food and cover in the hammocks.

Deer.—Deer thrive on the same soils as turkeys. They live in hammock areas or in palmetto clumps in or near swamps. Choice foods here and in the flatwoods are the leafy parts of many of the same plants that turkeys eat. Deer also like to have a plentiful supply of water nearby.

Bobwhite quail.—These birds thrive on all except the wettest soils of the county. They feed on the same native berries, seeds, and acorns that turkeys eat in areas of flatwoods soils, scrub areas of Pomello soils, and on such soils as Ft. Drum, Wabasso, and Adamsville near hammocks and swamps. The number of bobwhite quail varies from year to year, depending on the amount of rainfall during the spring and early in summer. Bobwhite quail thrive in intensively farmed areas. In recent years, how-

[6] By HOWARD R. BISSLAND, biologist, Soil Conservation Service.

ever, their numbers have declined in the county because of the increase in the number of large commercial dairies.

Mourning dove.—Mourning doves prefer most of the same soil areas as bobwhite quail, but they are more common in areas of cropland, pasture, or idle land. They are both resident and migratory birds. These birds also live in the dry sandy scrub areas of Pomello and Paola soils, where they can pick up grit for their craw.

Squirrel.—The number of gray squirrel in the county is small. Most gray squirrels live in the more heavily wooded areas of flatwoods soils, on the Parkwood soils in hammocks, and in swamps. The number of fox squirrel in the county was never large, and it has declined in recent years. The continuing conversion of pinewoods to improved pasture has reduced the availability of pine mast, which is a major food for fox squirrel.

Fox, gray.—The range of the gray fox in the county is wide. These animals feed mostly on small animals and seek them wherever they occur. The fox makes his den in hollow logs or digs it in the drier areas of such soils as the Immokalee, Paola, and Pomello. In many areas the fox uses gopher turtle holes as a den. The number of fox in the county is decreasing.

Raccoon.—Many raccoon live in the county. They frequent all areas of the county, but especially the more heavily wooded areas. Choice foods are native berries, rodents, and shellfish. They also eat field crops and citrus.

Wild hog.—Wild hogs live in swamps and adjacent flatwoods where they forage for roots, berries, and acorns and have a plentiful supply of water for wallowing. Past hunting has reduced their number considerably.

Ducks.—Florida mallards are wild ducks that live in the county all year. They like areas of open water on ponds in areas of Delray and Placid soils and on marshes of Okeelanta soils. In winter migratory wild ducks, such as pintail, mallards, widgeon, and teal, also inhabit these ponded soil areas.

Fish.—Game fish in the county are mainly in the Kissimmee River, at the mouth of Taylor Creek, and in Lake Okeechobee. No natural lakes are within the county proper, and ponded soil areas are dry at times or are isolated from natural breeding areas. Because of the high water table, dug ponds can be established on many soils, but such ponds are not locally popular for fishing. The principal fish caught at the mouth of Taylor Creek is speckled perch. In the Kissimmee River and in Lake Okeechobee the main fish are largemouth black bass, bluegill bream, and shellcrackers. Channel and white catfish are harvested commercially in Lake Okeechobee.

Nongame wildlife.—Many other kinds of wildlife occur in Okeechobee County. Large numbers of rabbits and armadillos frequent all soil areas. The armadillo, which has only been introduced to the county in the last 50 years, has increased rapidly and is considered a pest.

Large, sandhill cranes commonly are seen in twos and threes. They feed in broad open areas of flatwoods soils and in sloughs on such soils as the Basinger, Charlotte, and Pompano. These birds nest in shallow ponded areas of these soils and also in such areas in the Delray, Felda, and Placid soils.

Cattle egrets, though not native in the county, occur in great numbers and feed on insects alongside grazing cattle. They nest in trees in swamps and in thickets near ponds.

Small numbers of alligators and bobcats live in the swamps and in heavily wooded soil areas.

Wading birds, such as snowy egrets, white and wood ibis, little blue heron, and limpkins, were abundant at one time but their numbers have decreased greatly in recent years. This decrease is largely because of changes in use in land that involve increased drainage and more intensive use of wetland soils. In areas of ponded soils, however, flocks of these water birds are common. They nest in bushes and trees over water. Choice foods are snails, small fish, frogs, and insects in ponded areas and on adjacent sloughs.

Engineering Uses of the Soils[7]

Soils engineering is well established today. It is widely used in structural engineering, for it deals with soil as foundation material and as structural material. Soil, to the engineer, is a natural material that varies widely from place to place. The engineering properties of this material also vary widely, even within the boundaries of a single project. Generally, soil is used in the condition in which it occurs in the locality. A large part of soils engineering, however, involves selecting the best possible soil or soils for each construction project. In doing so, engineers determine the engineering properties of the soils at a proposed site and correlate them with construction requirements.

This soil survey contains information about the soils of Okeechobee County that will be helpful to engineers. Emphasis in this section is placed on engineering properties that are related to agriculture, especially properties that affect irrigation structures, farm ponds, and structures that control and conserve soil and water.

The information can be used by engineers to—

1. Make studies that will aid in selecting and developing sites for industries, businesses, residences, and recreational areas.
2. Make estimates of the engineering properties of soils for use in the planning of agricultural drainage systems, farm ponds, and irrigation systems, and other structures for conserving soil and water.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting locations for highways, airports, pipelines, powerlines, and cables, and in planning more detailed surveys at the selected locations.
4. Locate probable sources of sand, gravel, and other materials suitable for construction needs.
5. Correlate performance of engineering structures with mapping units to develop information for overall planning that will be useful in designing and maintaining certain engineering practices and structures.

[7] By ROBERT G. JESSUP, assistant State conservation engineer, Soil Conservation Service; DAVID P. POWELL, soil specialist for interpretation, Soil Conservation Service; and WILLIAM A. WISNER, JR., geologist, Division of Materials and Tests, Florida Department of Transportation.

6. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
7. Supplement information obtained from other published maps and reports and aerial photographs, for the purpose of making soil maps and reports that can be used readily by engineers.
8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

Used with the soil map to identify the soils, the information in this survey can be useful for many purposes. It should be emphasized that the interpretations do not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads or where the excavations are deeper than the depths of layers here reported. Also, engineers should not apply specific values to the estimates for bearing capacity given in this survey. Even in these situations, however, the interpretations and the soil map are useful in planning more detailed field investigations and suggesting the kinds of problems that can be expected.

The soil mapping units shown on the maps in this survey may include small areas of a different soil material. These included soils may be as much as 2 acres in size. They are too small to be mapped separately and gen-

TABLE 4.—*Engineering*

[Tests performed by Florida Department of Transportation (DOT) in accordance

Soil name and location	DOT Lab. No. 4816–S	Depth	Mechanical analysis [1] Percentage passing sieve— No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)
Basinger fine sand:		*Inches*			
Along Eagle Island Rd., 5 mi. W. of U.S. Highway No. 441, SW¼SW¼ sec. 35, T. 34 S., R. 34 E. (Modal).	33	9–19	100	98	7
	34	38–60	100	96	10
300 ft. W. of Jim Durrance Rd. and 1 1⁄10 mi. S. of Eagle Island Rd. NE¼NE¼ sec. 10, T. 35 S., R. 33 E. (Modal).	92	16–21	100	96	7
	93	21–50	100	96	12
Charlotte fine sand:					
2½ mi. N. of Eagle Island Rd., ⅓ mi. NE. of Griffith Ranch Headquarters, SE¼NE¼ sec. 20, T. 34 S., R. 34 E. (Modal).	99	19–30	100	98	13
	100	30–46	100	98	11
Chobee fine sandy loam:					
2 mi. E. of U.S. Highway No. 441, SE¼NW¼ sec. 24, T. 36 S., R. 35 E. (Modal).	27	7–22	100	99	42
	28	22–38	100	99	44
	29	38–63	100	99	40
Delray fine sand:					
9⁄10 mi. W. of U.S. Highway No. 441, 200 ft. S. of Durrance Rd., NW¼NW¼ sec. 33, T. 37 S., R. 35 E. (Modal).	81	18–46	100	99	10
	82	46–60	100	99	25
Felda fine sand:					
1 mi. N. and ⅓ mi. W. of Basinger, NW¼NW¼ sec. 28, T. 35 S., R. 33 E. (Modal).	87	8–22	100	99	12
	88	22–32	100	99	25
	89	42–60	100	99	9
Immokalee fine sand:					
300 ft. W. of U.S. Highway No. 441, just S. of Spicy Island Rd., SW¼SW¼ sec. 10, T. 36 S., R. 35 E. (Modal).	97	35–43	100	99	21
	98	43–54	100	99	17
Myakka fine sand:					
⅔ mi. W. of U.S. Highway No. 441, 150 ft. S. of Trice Dairy Rd., NE¼SW¼ sec. 1, T. 34 S., R. 35 E. (Modal).	19	6–24	100	92	5
	20	24–30	100	92	13
	21	30–58	100	91	15
Paola fine sand:					
100 yds. E. of Fort Drum Station, SW¼ sec. 11, T. 34 S., R. 35 E. (Modal).	1	0–8	100	96	5
	2	11–17	100	96	8
	3	27–66	100	96	4
Parkwood fine sand:					
Hammock N. of Basswoods Estates office, 3⁄10 mi. E. of U.S. Highway No. 98, NW¼SE¼ sec. 6, T. 37 S., R. 35 E. (Modal).	58	9–20	97	95	25
	59	20–39	[5] 92	88	19
	60	39–50	89	85	19
Placid fine sand:					
1 mi. E. of U.S. Highway No. 441, 300 yds. N. of State Route 68, SE¼SE¼, sec. 2, T. 35 S., R. 35 E. (Modal).	46	0–11	100	97	18
	47	24–48	100	95	6
9⁄10 mi. N. of State Route 68 on Flying B Ranch, SE¼SE¼ sec. 28, T. 35 S., R. 34 E. (Btg horizon at a depth of 47 inches).	50	9–23	100	98	17
	51	47–60+	100	97	17

See footnotes at end of table.

erally are not significant to the agriculture in the area but may be important in engineering planning.

Some of the terms used by the soil scientist may be unfamiliar to the engineer, and some words—for example, soil, clay, silt, sand, and aggregate—have special meaning in soil science. These terms, as well as other special terms that are used in the soil survey, are defined in the Glossary at the back of this survey.

The engineering interpretations are based on data obtained by taking samples from a number of soil profiles in this county and testing them in the Soils Laboratory, Department of Transportation. They were also based on data obtained from testing similar soils outside the county. Most of the information in this section is given in tables 4, 5, and 6.

Engineering classification systems

Soil scientists of the U.S. Department of Agriculture classify soils according to texture (*6*). In some ways this system of naming textural classes is comparable to the systems most commonly used by engineers for classifying soils; that is, the system of the American Association of State Highway Officials (AASHO) (*1*) and the Unified system (*8*) used by the U.S. Army Corps of Engineers.

Most highway engineers classify soil material according to the AASHO system. In this system soil materials

test data

with standard procedures of American Association of State Highway Officials (AASHO)]

Mechanical analysis [1]—Continued: Percentage smaller than— 0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.	Liquid limit	Plasticity index	Moisture density: Maximum dry density	Optimum moisture	Classification: AASHO [2]	Unified [3]
5	3	0	0	[4] NP	[4] NP	104. 5	14. 4	A-3(0)	SP-SM
10	9	7	6	NP	NP	109. 1	13. 2	A-3(0)	SP-SM
5	3	2	1	NP	NP	103. 0	15. 0	A-3(0)	SP-SM
9	4	1	0	NP	NP	103. 0	14. 2	A-2-4(0)	SP-SM
9	2	2	1	NP	NP	100. 0	15. 5	A-2-4(0)	SM
9	7	6	5	NP	NP	106. 5	13. 8	A-2-4(0)	SP-SM
38	31	28	26	42	21	101. 7	19. 5	A-7(4)	SC
41	35	28	26	41	25	105. 8	16. 6	A-7(6)	SC
37	32	26	25	37	23	107. 7	16. 4	A-6(4)	SC
8	3	1	0	NP	NP	98. 6	17. 1	A-3(0)	SP-SM
21	14	12	12	NP	NP	110. 1	14. 1	A-2-4(0)	SM
9	3	1	0	NP	NP	97. 4	17. 6	A-2-4(0)	SP-SM
22	17	14	14	23	8	110. 3	14. 5	A-2-4(0)	SC
8	5	3	2	NP	NP	100. 9	13. 6	A-3(0)	SP-SM
18	12	8	5	NP	NP	103. 0	15. 0	A-2-4(0)	SM
14	8	7	5	NP	NP	104. 1	13. 8	A-2-4(0)	SM
5	5	2	1	NP	NP	99. 6	15. 7	A-3(0)	SP-SM
11	7	3	2	NP	NP	94. 3	17. 7	A-2-4(0)	SM
5	4	0	0	NP	NP	104. 0	14. 0	A-2-4(0)	SM
4	3	1	1	NP	NP	98. 9	16. 8	A-3(0)	SP-SM
7	5	3	1	NP	NP	101. 2	15. 6	A-3(0)	SP-SM
4	3	1	1	NP	NP	102. 3	16. 3	A-3(0)	SP
22	17	14	12	NP	NP	110. 8	15. 0	A-2-4(0)	SM
17	14	11	11	NP	NP	110. 7	14. 0	A-2-4(0)	SM
16	12	11	10	NP	NP	112. 3	13. 2	A-2-4(0)	SM
15	11	4	2	NP	NP	85. 0	25. 8	A-2-4(0)	SM
5	3	1	1	NP	NP	100. 1	16. 3	A-3(0)	SP-SM
13	7	3	2	NP	NP	100. 8	18. 0	A-2-4(0)	SM
15	13	10	9	NP	NP	113. 2	11. 4	A-2-4(0)	SM

TABLE 4.—*Engineering*

Soil name and location	DOT Lab. No. 4816–S	Depth	Mechanical analysis [1]		
			Percentage passing sieve—		
			No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)
		Inches			
Pomello fine sand:					
Along State Route 68, just inside SW corner of sec. 29, T. 35 S., R. 35 E. (Modal).	6	6–42	100	96	7
	7	42–45	100	96	10
	8	51–66	100	96	9
Pompano fine sand:					
1½ mi. W. of Trice Dairy and 800 ft. S. of grade, NE¼NE¼ sec. 19, T. 34 S., R. 35 E. (Modal).	22	16–30	100	99	4
	23	30–57	100	99	7
Wabasso fine sand:					
¼ mi. N. of old railroad grade on Williamson Ranch, SW¼SE¼ sec. 24, T. 36 S., R. 35 E. (Modal).	44	17–26	100	99	11
	45	34–60	100	99	26
1¼ mi. E. of Jim Durrance Rd., 8/10 mi. S. of Eagle Island Rd., SE¼SW¼ sec. 1, T. 35 S., R. 33 E. (Modal).	74	21–27	100	96	10
	75	27–35	100	98	24
	76	35–52	100	97	23

[1] Mechanical analyses according to AASHO Designation: T 88–57 (*1*). Results by this procedure frequently may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2.0 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2.0 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.

TABLE 5.—*Estimated*

[Not included in this table, because their characteristics are too variable for engineering use, are the land types Borrow pits (Bo), Made applicable. >=more

Map symbol	Soil	Flooding hazard	Depth to seasonal high water table	Depth from surface
				Inches
Ad	Adamsville fine sand	Every 1 to 5 years for 2 to 7 days.[1]	0 to 15 inches for 1 to 2 months.	0–70
Ba	Basinger fine sand	Every year for 1 to 6 months.[1]	0 to 15 inches for 2 to 6 months.	0–60
Bc	Basinger-Placid complex (For properties of the Basinger and Placid parts of this unit, refer to Basinger fine sand and Placid fine sand, respectively, in this table.)	Every year for more than 6 months.[2]	0 to 15 inches continuously.	----------
Bm	Basinger and Pompano fine sands, ponded (For properties of the Basinger and Pompano parts of this unit, refer to Basinger fine sand and Pompano fine sand, respectively, in this table.)	Every year for more than 6 months.[2]	0 to 15 inches continuously.	----------
Br	Bradenton fine sand	Every 1 to 5 years for 7 to 30 days.[1]	0 to 15 inches for 1 to 2 months.	0–10
				10–26
				26–70
Ch	Charlotte fine sand	Every year for 1 to 6 months.[1]	0 to 15 inches for 2 to 6 months.	0–75
Co	Chobee fine sandy loam	Every year for more than 6 months.[2]	0 to 15 inches for 6 to 12 months.	0–7
				7–22
				22–63

See footnotes at end of table.

test data—Continued

Mechanical analysis [1]—Continued				Liquid limit	Plasticity index	Moisture density		Classification	
Percentage smaller than—									
0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			Maximum dry density	Optimum moisture	AASHO [2]	Unified [3]
5	2	0	0	NP	NP	96. 8	17. 2	A-3(0)	SP-SM
9	6	2	1	NP	NP	99. 0	16. 6	A-3(0)	SP-SM
7	4	2	1	NP	NP	102. 5	15. 0	A-3(0)	SP-SM
3	2	0	0	NP	NP	100. 0	17. 0	A-3(0)	SP
6	4	2	2	NP	NP	101. 0	15. 3	A-3(0)	SP-SM
8	2	0	0	NP	NP	101. 5	15. 4	A-2-4(0)	SP-SM
24	21	19	17	27	10	111. 2	13. 5	A-2-4(0)	SC
8	5	2	1	NP	NP	105. 7	13. 6	A-3(0)	SP-SM
22	20	17	17	26	12	109. 1	14. 8	A-2-6(4)	SC
22	20	17	16	23	9	113. 4	13. 4	A-2-4(0)	SC

[2] Based on AASHO Designation: M 145-49 (*1*).
[3] Based on the Unified Soil Classification System (*8*). SCS and BPR have agreed that all soils having a plasticity index within two points from A-line are to be given a borderline classification. An example of a borderline classification is SP-SM.
[4] Nonplastic.
[5] Percentage larger than 2.0 millimeters consists of cemented marl concretions formed in old root channels.

properties

land (Ma), and Spoil banks (Sp). Absence of an entry in a column indicates a determination was not made or that it would not be than, and <=less than]

Classification			Percentage passing No. 200 sieve (0.074 mm.)	Permeability	Available water capacity	Reaction	Shrink-swell potential
USDA	Unified	AASHO					
				Inches per hour	*Inches per inch of soil*		
Fine sand	SP or SP-SM	A-3 or A-2	3-12	>6. 3	<0. 05	5. 6-7. 3	Low.
Fine sand	SP-SM	A-3 or A-2	5-12	>6. 3	<0. 05	4. 5-5. 5	Low.
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Fine sand	SP-SM or SM	A-3 or A-2	5-15	>6. 3	0. 05-0. 10	5. 6-6. 5	Low.
Fine sandy loam	SM or SC	A-2-4	25-35	0. 63-2. 0	0. 10-0. 15	6. 6-7. 3	Low to moderate.
Fine sandy loam	SM or SC	A-2-4	25-35	0. 63-2. 0	0. 10-0. 15	7. 4-8. 0	Low to moderate.
Fine sand	SP-SM or SM	A-3 or A-2	5-15	>6. 3	0. 05	5. 6-7. 5	Low.
Fine sandy loam	SC	A-6 or A-7	40-50	0. 20-0. 63	0. 15-0. 20	6. 1-7. 0	Moderate.
Sandy clay loam	SC	A-6 or A-7	40-50	0. 06-0. 20	0. 10-0. 15	6. 6-7. 3	Moderate to high.
Sandy clay loam	SC	A-6 or A-7	40-50	0. 06-0. 20	0. 10-0. 15	7. 4-8. 0	Moderate to high.

TABLE 5.—*Estimated*

Map symbol	Soil	Flooding hazard	Depth to seasonal high water table	Depth from surface
De	Delray fine sand	Every year for more than 6 months.[2]	0 to 15 inches for 6 to 12 months.	0–18 18–46 46–60
Dt	Delray fine sand, thin solum variant[3]	Every year for 7 to 30 days.[1]	0 to 15 inches for 2 to 6 months.	0–12 12–30 30–48
Ef	Elred fine sand	Every 1 to 5 years for 5 years for 7 to 30 days.[2]	0 to 15 inches for 1 to 2 months.	0–36 36–48 48–66
Ff	Felda fine sand	Every year for 1 to 6 months.[1, 2]	0 to 15 inches for 2 to 6 months.	0–22 22–32 32–60
Fp	Felda, Pompano, and Placid soils, ponded (For properties of the Felda, Pompano, and Placid parts of this unit, refer to Felda fine sand, Pompano fine sand, and Placid fine sand, respectively, in this table.)	Every year for more than 6 months.[2]	0 to 15 inches continuously.	----------
Fr	Ft. Drum fine sand	Every 1 to 5 years for 2 to 7 days.[1]	0 to 15 inches for 1 to 2 months.	0–17 17–25 25–70
Im	Immokalee fine sand	Every 1 to 5 years for 2 to 7 days.[1]	0 to 15 inches for 1 to 2 months.	0–35 35–43 43–72
Mc	Manatee loamy fine sand	Every year for more than 6 months.[2]	0 to 15 inches for 6 to 12 months.	0–18 18–36 36–60
Mo	Manatee, Delray, and Okleelanta soils (For properties of the Manatee, Delray, and Okeelanta parts of this unit, refer to Manatee loamy fine sand, Delray fine sand, and Okeelanta peat, respectively, in this table.)	Every year for more than 6 months.[4]	0 to 15 inches continuously.	----------
My	Myakka fine sand	Every 1 to 5 years for 2 to 7 days.[1]	0 to 15 inches for 1 to 2 months.	0–24 24–30 30–66
Oe	Okeelanta peat	Every year for more than 6 months.[2]	0 to 15 inches continuously.	0–28 28–48
Pa	Pamlico muck	Every year for more than 6 months.[2]	0 to 15 inches continuously.	0–30 30–60
Pd	Paola fine sand	None	40 to 60 inches for 1 to 2 months.	0–66
Pe	Parkwood fine sand	Every year for 7 to 30 days.[1]	0 to 15 inches for 2 to 6 inches.	0–9 9–22 22–70
Pf	Placid fine sand	Every year for more than 6 months.[2]	0 to 15 inches for 6 to 12 months.	0–20 20–75
Ph	Placid, Pamlico, and Delray soils, ponded (For properties of the Placid, Pamlico, and Delray parts of this unit, refer to Placid fine sand, Pamlico fine sand, and Delray fine sand, respectively, in this table.)	Every year for more than 6 months.[4]	0 to 15 inches continuously.	----------
Pm	Pomello fine sand	None	30 to 60 inches for 2 to 6 months.	0–42 42–47 47–66

See footnotes at end of table.

properties—Continued

Classification			Percentage passing No. 200 sieve (0.074 mm.)	Permeability	Available water capacity	Reaction	Shrink-swell potential
USDA	Unified	AASHO					
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	>0. 20	5. 6–7. 0	Low.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	0. 05–0. 10	6. 1–7. 3	Low.
Fine sandy loam	SM or SM–SC	A–2–4	20–30	0. 63–2. 0	0. 10–0. 15	6. 5–7. 5	Low to moderate.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	>0. 20	6. 1–7. 3	Low.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	0. 05–0. 10	6. 1–7. 3	Low.
Fine sandy loam	SM or SM–SC	A–2–4	20–30	0. 63–2. 0	0. 10–0. 15	7. 0–8. 0	Low to moderate.
Fine sand	SP–SM or SM	A–3 or A–2	5–15	>6. 3	<0. 05	5. 6–7. 3	Low.
Fine sandy loam	SM–SC or SC	A–2–4	20–35	0. 63–2. 0	0. 10–0. 15	6. 1–7. 3	Low to moderate.
Fine sand	SP–SM or SM	A–3 or A–2	5–15	>6. 3	<0. 05	6. 6–7. 5	Low.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	<0. 05	5. 5–6. 5	Low.
Fine sandy loam	SM–SC or SC	A–2–4	20–35	0. 63–2. 0	0. 10–0. 15	6. 6–7. 3	Low to moderate.
Fine sand and loamy fine sand.	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	0. 05–0. 10	6. 6–7. 3	Low.
Fine sand	SP–SM or SM	A–3	5–15	>6. 3	<0. 05	5. 1–6. 5	Low.
Fine sandy loam	SM–SC or SC	A–2–4	15–35	0. 63–2. 0	0. 10–0. 15	7. 4–8. 0	Low.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–20	>6. 3	<0. 05	6. 5–7. 5	Low.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	<0. 05	4. 5–5. 5	Low.
Fine sand	SP–SM or SM	A–2–4	10–20	2. 0–6. 3	0. 05–0. 10	4. 5–5. 5	Low.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	<0. 05	4. 5–5. 5	Low.
Loamy fine sand or mucky loamy fine sand.	SM	A–2–4	12–20	>6. 3	>0. 20	6. 1–7. 5	Low.
Fine sandy loam	SM or SC	A–2	20–35	0. 63–2. 0	0. 10–0. 15	6. 6–7. 5	Low to moderate.
Fine sandy loam	SM or SC	A–2	20–35	0. 63–2. 0	0. 10–0. 15	7. 4–8. 0	Low to moderate.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	<0. 05	4. 5–5. 5	Low.
Fine sand	SP–SM or SM	A–2–4	10–20	2. 0–6. 3	0. 05–0. 10	4. 5–5. 5	Low.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	<0. 05	4. 5–5. 5	Low.
Peat	Pt			>6. 3	>0. 20	6. 1–7. 3	High.
Fine sand or sand	SP or SP–SM	A–3	3–12	>6. 3	<0. 05	6. 1–7. 3	Low.
Muck	Pt			>6. 3	>2. 0	4. 0–5. 5	High.
Sand or fine sand	SP or SP–SM	A–3	3–12	>6. 3	<0. 05	4. 5–5. 5	Low.
Fine sand	SP or SP–SM	A–3	4–10	>6. 3	<0. 05	4. 5–5. 5	Low.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	<0. 05	6. 1–7. 3	Low.
Fine sandy loam	SM or SC	A–2–4	20–35	0. 63–2. 0	0. 05–0. 10	7. 4–8. 0	Low.
Loamy fine sand	SM or SC	A–2–4	15–30	2. 0–6. 3	0. 05–0. 10	7. 4–8. 0	Low.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	0. 15–0. 20	4. 0–5. 5	Low.
Fine sand	SP–SM or SM	A–3 or A–2–4	5–15	>6. 3	<0. 05	4. 5–5. 5	Low.
Fine sand	SP or SP–SM	A–3	3–12	>6. 3	<0. 05	4. 5–5. 5	Low.
Fine sand	SP–SM	A–3 or A–2–4	5–15	2. 0–6. 3	0. 05–0. 10	4. 5–5. 5	Low.
Fine sand	SP or SP–SM	A–3	3–12	>6. 3	<0. 05	4. 5–5. 5	Low.

TABLE 5.—*Estimated*

Map symbol	Soil	Flooding hazard	Depth to seasonal high water table	Depth from surface
Pn	Pompano fine sand	Every year for 1 to 6 months.[1]	0 to 15 inches for 2 to 6 months.	0–75
Se	Seewee fine sand	None	30 to 60 inches for 6 to 12 months.	0–36 36–53 53–63
St	St. Johns sand	Every year for 7 to 30 days.[1]	0 to 15 inches for 2 to 6 months.	0–22 22–42 42–72
Tc	Terra Ceia peat	Every year for more than 6 months.[2]	0 to 15 inches continuously.	0–48 48–60
Wa	Wabasso fine sand	Every 1 to 5 years for 2 to 7 days.[1]	0 to 15 inches for 1 to 2 months.	0–16 16–30 30–48 48–75

[1] Result of slow runoff on nearly level areas.
[2] In ponded depressions.
[3] Twenty percent of this mapping unit has limerock within a depth of 30 inches and rock crops out in places.

TABLE 6.—*Engineering*

[Interpretations for engineering uses were not made for Borrow pits (Bo), Made land (Ma), or

Map symbols	Soil name	Suitability as a source of—		Soil features affecting—	
		Topsoil	Road fill	Highway location	Dikes and levees
Ad	Adamsville fine sand	Poor	Fair to good	Periodic high water table and flooding.	Rapid permeability
Ba	Basinger fine sand	Poor	Fair to good	High water table; low position; periodic flooding.	Rapid permeability
Bc	Basinger-Placid complex.	Poor	Poor to fair	High water table, low position; frequent flooding; mucky surface layer in some places.	Rapid permeability
Bm	Basinger and Pompano fine sands, ponded.	Poor	Fair	High water table; low position; frequent flooding.	Rapid permeability
Br	Bradenton fine sand	Fair	Poor to fair	High water table	None
Ch	Charlotte fine sand	Poor	Fair	High water table; low position; periodic flooding.	Rapid permeability
Co	Chobee fine sandy loam.	Fair to good	Poor	High water table; low position; frequent flooding; high content of organic matter; clayey subsoil.	Plastic, clayey material
De	Delray fine sand	Good	Poor to fair	High water table; low position; frequent flooding; mucky surface layer in some places.	High content of organic matter in surface layer in most places; rapid permeability.
Dt	Delray fine sand, thin solum variant.	Good	Poor to fair	High water table; low position; periodic flooding; mucky surface layer.	High content of organic matter in surface layer; rapid permeability in upper 2½ feet; rock in some places.
Ef	Elred fine sand	Poor	Fair	Periodic high water table and flooding.	None

See footnote at end of table.

properties—Continued

Classification			Percentage passing No. 200 sieve (0.074 mm.)	Permea-bility	Available water capacity	Reaction	Shrink-swell potential
USDA	Unified	AASHO					
Fine sand	SP or SP-SM	A-3 or A-2-4	3-12	>6. 3	<0. 05	5. 6-7. 3	Low.
Fine sand	SP or SP-SM	A-3	3-12	>6. 3	<0. 05	5. 6-7. 0	Low.
Sand or mucky sand	SP-SM or SM	A-3 or A-2-4	5-15	>6. 3	>0. 20	5. 6-7. 3	Low to moderate.
Sand	SP-SM or SM	A-3 or A-2	5-15	>6. 3	<0. 05	5. 6-7. 3	Low.
Sand	SP-SM or SM	A-3 or A-2	5-15	>6. 3	0. 05-0. 10	4. 5-5. 5	Low.
Sand	SP-SM or SM	A-2-4	10-20	2. 0-6. 3	0. 05-0. 10	4. 5-5. 5	Low.
Sand	SP-SM or SM	A-3 or A-2	5-15	>6. 3	<0. 05	4. 5-5. 5	Low.
Peat over muck	Pt			>6. 3	>2. 0	6. 1-7. 5	High.
Fine sand	SP or SP-SM	A-3	3-12	>6. 3	<0. 05	6. 1-7. 5	Low.
Fine sand	SP-SM or SM	A-3 or A-2-4	5-15	>6. 3	<0. 05	4. 5-5. 5	Low.
Fine sand	SP-SM or SM	A-2-4	10-20	2. 0-6. 3	0. 05-0. 10	4. 5-5. 5	Low.
Fine sandy loam	SM or SC	A-2-4 or A-2-6	20-35	0. 63-2. 0	0. 10-0. 15	5. 6-7. 5	Low to moderate.
Fine sand or loamy fine sand.	SP-SM or SM	A-3 or A-2-4	5-25	>6. 3	<0. 05	5. 6-7. 5	Low.

[4] Applies to areas where no works of improvement have been installed. Flood plains subject to periodic flooding each year. Old stream channels flooded more than 6 months each year.

interpretations

Spoil banks (Sp) although in places Spoil banks is a fair to good source of material for road fill]

Soil features affecting—Continued			
Excavated farm ponds	Agriculture drainage	Sprinkler irrigation [1]	Subsurface irrigation
Unstable side slopes	Unstable side slopes	Low available water capacity	None.
Unstable side slopes	Low position; poor natural outlets; unstable side slopes.	Low available water capacity	Low position; periodic flooding.
Unstable side slopes	Low position; poor natural outlets; unstable side slopes.	Low available water capacity	Low position; frequent flooding.
Unstable side slopes	Low position; poor natural outlets; unstable side slopes.	Low available water capacity	Low position; frequent flooding.
Moderately permeable subsoil	Moderately permeable subsoil	Low available water capacity in sandy surface layer.	Moderately permeable subsoil.
Unstable side slopes	Low position; poor natural outlets; unstable side slopes.	Low available water capacity	Low position; periodic flooding.
Slow permeability; poor workability; high content of organic matter in surface layer.	Low position; poor natural outlets; slowly permeable subsoil.		Low position; frequent flooding; slowly permeable subsoil.
High content of organic matter in surface layer; unstable side slopes.	Low position; poor natural outlets; unstable side slopes.		Low position; frequent flooding.
High content of organic matter in surface layer; unstable side slopes.	Low position; poor natural outlets; rock crops out in places; unstable side slopes.		Low position; periodic flooding.
Unstable side slopes; moderate permeability in subsoil.	Moderately permeable subsoil	Low available water capacity in sandy surface layer.	Moderately permeable subsoil.

TABLE 6.—*Engineering*

Map symbols	Soil name	Suitability as a source of—		Soil features affecting—	
		Topsoil	Road fill	Highway location	Dikes and levees
Ff	Felda fine sand	Poor	Poor to fair	High water table; low position; frequent flooding.	None
Fp	Felda, Pompano, and Placid soils, ponded.	Poor to fair	Poor to fair	High water table; low position; frequent flooding.	Rapid permeability
Fr	Ft. Drum fine sand	Poor	Fair to good	Periodic high water table	Rapid permeability
Im	Immokalee fine sand	Poor	Fair to good	Periodic high water table and flooding.	Rapid permeability
Mc	Manatee loamy fine sand.	Good	Poor	High water table; high content of organic matter in surface layer; frequent flooding; low position.	High content of organic matter in surface layer.
Mo	Manatee, Delray, and Okeelanta soils.	Good	Poor	High water table; low position; frequent flooding; high content of organic matter.	High content of organic matter
My	Myakka fine sand	Poor	Fair to good	Periodic water table and flooding.	Rapid permeability
Oe	Okeelanta peat	Good if mixed with mineral soil.	Not suitable	High water table; low position; thick organic layer.	High shrink-swell potential; subsidence and oxidation.
Pa	Pamlico muck	Good if mixed with mineral soil.	Not suitable	High water table; low position; frequent flooding; organic soil.	High shrink-swell potential; subsidence and oxidation.
Pd	Paola fine sand	Poor	Good	Deep, loose sand	Loose sand; rapid permeability
Pe	Parkwood fine sand	Good	Fair	High water table; occasional flooding.	None
Pf	Placid fine sand	Good	Poor to fair	High water table; low position; frequent flooding; some mucky surface layer in places.	High content of organic matter in surface layer; rapid permeability.
Ph	Placid, Pamlico, and Delray soils, ponded.	Poor to fair	Not suitable	High water table; low position; frequent flooding; high content or organic matter.	High content of organic matter
Pm	Pomello fine sand	Poor	Good	Loose sand; difficult to establish protective cover.	Loose sand; rapid permeability
Pn	Pompano fine sand	Poor	Fair	High water table; low position; periodic flooding.	Rapid permeability
Se	Seewee fine sand	Poor	Fair	Mucky substratum at a depth below 3 feet.	Rapid permeability; mucky subsoil.
St	St. Johns sand	Good	Fair	High water table; periodic flooding.	Rapid permeability
Tc	Terra Ceia peat	Good if mixed with mineral soil.	Not suitable	High water table; low position; frequent flooding; organic soil.	High shrink-swell potential; subsidence and oxidation.
Wa	Wabasso fine sand	Poor	Fair	High water table	None

[1] Where no adverse features are indicated, the soils generally are irrigated by flooding or manipulation of the water table.

interpretations—Continued

Soil features affecting—Continued			
Excavated farm ponds	Agriculture drainage	Sprinkler irrigation [1]	Subsurface irrigation
Unstable side slopes; moderately permeable subsoil.	Low position; poor natural outlets; moderately permeable subsoil.	Low available water capacity in sandy surface layer.	Low position; frequent flooding; moderately permeable subsoil.
Unstable side slopes; moderately permeable subsoil in some places.	Low position; poor natural outlets; moderately permeable subsoil; unstable side slopes.		Low position; frequent flooding.
Unstable side slopes	Moderately permeable subsoil; unstable side slopes.	Low available water capacity	Moderately permeable subsoil.
Unstable side slopes	Unstable side slopes	Low available water capacity	None.
Moderate permeability	Moderately permeable subsoil		Low position; frequent flooding; moderately permeable subsoil.
High content of organic matter in surface layer; moderately permeable subsoil in places.	Subject to overflow; moderately permeable subsoil; low position.		Low position; frequent flooding; moderately permeable subsoil in places.
Unstable side slopes	Unstable side slopes	Low available water capacity	None.
Pond borders have low bearing value.	Low position; poor natural outlets; subsidence and oxidation.		Low position; frequent flooding.
Pond borders have low bearing value.	Low position; poor natural outlets; subsidence and oxidation.		Low position; frequent flooding.
Deep to water table; rapid permeability; loose sand; unstable side slopes.	None	Low available water capacity	Deep to water table; rapid permeability.
Moderately permeable subsoil	Moderately permeable subsoil		Moderately permeable subsoil.
High content of organic matter in surface layer; unstable side slopes; poor natural outlets.	Low position; poor natural outlets; unstable side slopes.		Low position; frequent flooding.
High content of organic matter in surface layer.	Low position; poor natural outlets.		Low position; frequent flooding.
Low water table; rapidly permeable; loose sand; unstable side slopes.	Unstable side slopes	Low available water capacity; deep to water table.	Not applicable.
Unstable side slopes	Low position; poor natural outlets; unstable side slopes.	Low available water capacity	Low position; periodic flooding.
Unstable side slopes	Unstable side slopes	Low available water capacity	Not applicable.
Unstable side slopes	Low position; unstable side slopes.	Low available water capacity	Periodic flooding.
Pond borders have low bearing value.	Low position; poor outlets; subsidence and oxidation.		Low position; frequent flooding.
Unstable side slopes; moderately permeable subsoil.	Moderately permeable subsoil	Low available water capacity in sandy surface layer.	Moderately permeable subsoil.

are classified in seven principal groups. The groups range from A–1 (gravelly soils having high bearing capacity, the best soils for subgrade) to A–7 (clayey soils having low strength when wet, the poorest soils for subgrade). Within each group the relative engineering value of the soil material is indicated by a group index number. Group index numbers range from 0 for the best materials to 20 for the poorest. The group index number for the tested soils is shown in parentheses after the soil group symbol in table 4.

Some engineers prefer to use the Unified Soil Classification System. In this system soil materials are identified as coarse grained, 8 classes; fine grained, 6 classes; or highly organic. Table 4 gives the classification of the tested soils, according to the Unified System.

Engineering test data

Soil samples from some important series in Okeechobee County were tested by standard procedures to help evaluate the soils for engineering purposes. The tests were performed by the Florida Department of Transportation. The samples were taken in representative sites, and only selected layers of each soil were sampled. All samples were obtained at a depth of less than 7 feet. The test data therefore may not be adequate for estimating the characteristics of soil material at a greater depth. Tests made were for grain-size distribution, liquid limit, plastic limit, and moisture-density relationships. The results of the tests and the classification of each sample, according to both the AASHO and Unified systems, are given in table 4.

The engineering classifications in table 4 are based on data obtained by mechanical analysis and by tests to determine liquid limits and plastic limits. The mechanical analysis was made by combined sieve and hydrometer methods.

The tests for liquid limit and plastic limit measure the effect of water on consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a semisolid to a plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The *plastic limit* is the moisture content at which the soil material passes from a semisolid to a plastic state. The *liquid limit* is the moisture content at which the soil material passes from a plastic to a liquid state. The *plasticity index* is the numerical difference between liquid limit and plastic limit. It indicates the range in moisture content within which a soil material is in a plastic condition.

In the *moisture density*, or compaction test, a sample of the soil material is compacted several times with a constant compactive effort, each time at a successively higher moisture content. The density or unit weight of the soil material increases until the optimum moisture content is reached. After that the density decreases with increase in moisture content. The highest density obtained in the compaction test is termed "maximum density." Moisture-density data are important in construction, for as a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density when it is at approximately the optimum moisture content.

Engineering properties

Table 5 lists the mapping units in the county, the map symbols for each, and gives estimates of soil properties significant to some engineering work. Borrow pits, Made land, and Spoil banks, however, are not listed in the table. These land types are too variable in characteristics to be rated or otherwise are not suitable for engineering use. The estimates are based on soil test data in table 4, on information in the rest of the survey, and on experience with similar soils in this and other counties. The estimates apply only to the soils of Okeechobee County. Because bedrock is at a great depth in the county and is not significant to engineering, it is not mentioned in table 5.

The column that shows permeability in table 5 gives the estimated rate at which water moves through a soil that is not compacted. The rate is expressed in inches per hour.

The available water capacity, measured in inches per inch of soil, is an approximation of the amount of capillary water in the soil that is available to plants when the downward flow caused by gravity has practically stopped. The following terms are used to express available water capacity: Less than 0.05, *very low;* 0.05 to 0.10, *low;* 0.10 to 0.15, *medium;* 0.15 to 0.20, *high;* and more than 0.20, *very high.*

Reaction refers to the acidity or alkalinity of the soils. It is the estimated range in pH values for each major horizon as determined in the field. A pH of 7, for example, indicates a neutral soil; a lower pH value indicates acidity, and a higher value indicates alkalinity.

Shrink-swell potential refers to the change in volume of the soil that results from a change in moisture content. It is estimated on the basis of the amount and type of clay in the soil layers. In general, soils classified as CH in the Unified system or A–7 in the AASHO system have high shrink-swell potential. Clean sand and gravel and soils that contain only a small amount of nonplastic to slightly plastic soil material have low shrink-swell potential.

Engineering interpretations

Table 6 rates the soils according to their suitability as a source of topsoil and road fill. It also gives facts that would affect use of the soils as sites for highways, for farm ponds, and for irrigation systems. The soil features listed are those that are unfavorable for construction, operation, or maintenance of the structure or practice shown. They should be taken into account in considering a soil for the stated use. Borrow pits, Made land, and Spoil banks are not listed in the table. These land types are too variable in characteristics to be rated or otherwise are not suitable for engineering.

The suitability of a soil for topsoil depends mainly on the fertility of the soil material and content of organic matter. The suitability of a soil for road fill depends largely on the texture of the soil, and on the consistence and natural content of water.

Choosing a location for a highway calls for careful consideration as to the kind of soil material and the need for drainage. In some soils of this county, a high water table, flooding, seepage, or the presence of plastic clay or of highly erodible sand in cut sections has to be con-

sidered in determining the location of a proposed highway.

Dikes and levees are low embankments that are constructed to protect land against overflow. For larger structures, more intensive investigations and designs are needed. Features listed in this column are those that adversely affect the suitability of soil materials for constructing dikes and levees.

Farm ponds in this county are constructed by excavating to a depth of several feet below the normal water table. Ground water fills the excavation, and the water level at any time depends upon the height of the seasonal water table. Features listed in table 6 that adversely affect the suitability of soils for excavated ponds are mainly those that affect the seepage rate and the stability of banks and side slopes.

The factors considered for agricultural drainage are those properties of the soil that affect the installing of surface and subsurface drainage systems and their performance. Features listed in this column are primarily elevation of one soil in relation to adjacent soils, availability of drainage outlets, and permeability of the least permeable layers.

Table 6 also gives features that affect the use of the soils for two main kinds of irrigation used in the county—sprinkler irrigation and subsurface irrigation. The total rainfall generally is adequate for farming, but irrigation is often needed because rainfall is poorly distributed. At times, the moisture required for the best growth of crops must be maintained by irrigation.

Sprinkler irrigation is not widely used in the county, but its use is increasing. Under this kind of irrigation, water is pumped through pipes and is applied to the soil through sprinklers in a way that simulates rain. Sprinkler irrigation is normally used on well-drained soils, but in this county it is used principally to supplement the moisture in soils that have been drained. Water is obtained from wells, ditches, or irrigation pits. Ditches or irrigation pits must have a storage capacity large enough to meet the needs of crops during the irrigation season. The content of salt in the irrigation water must be determined before the water is used for sprinkler irrigation.

Most of the soils in the county are nearly level and have a water table near the surface, and subsurface irrigation therefore is widely used for both crops and pastures. This method of irrigation maintains the water table within controlled limits. It permits adequate capillary movement of water from the water table into the root zone. A system of open ditches is used, because open ditches are comparatively inexpensive and operate satisfactorily.

Features that may adversely affect the suitability of soils for irrigation are texture, depth to the water table, available water capacity, permeability, position on the landscape, major surface irregularities, and susceptibility to flooding.

Nonfarm Uses of the Soils [8]

Okeechobee County is in the south-central part of Florida where the population is rapidly increasing. It is in the interior part of the State where the growth is not so rapid as in the Coastal areas, but it is near enough to these areas to be affected by their development. Expansion of industry, transportation, and recreational facilities are making increasing demands for changes in use of the soils. Although farming continues to be the foremost enterprise in the county, more and more land is being diverted to nonfarm uses.

An additional increase in population will require more homesites; more land for highways, streets, and parking areas; more space for businesses, industrial plants, schools, and churches; and additional sites for playgrounds, parks, and recreational areas. The kind of soils in an area has an important bearing on these uses, just as it has for farming. Many factors other than the kind and relative suitability of the soils for specific uses must be considered in determining changes in land use, but the properties of the soils are important. Knowledge of the soils is needed for making wise decisions about alternative uses and for determining the kind and degree of problems related to the soils that must be overcome before the site can be used for a specific purpose. Careful consideration of the soil properties during the early stages of urban development can prevent costly mistakes that are difficult to correct later (fig. 15).

This section gives limitations for a number of important nonfarm uses of the soils, and other parts of the soil survey give information needed for planning nonfarm uses. Table 7 groups the soils according to their limitations when they are used for the construction of buildings, for landscaping, sanitation, transportation, recreational purposes, and cemeteries. It also names the chief limiting properties for the soils of each group. The degree of limitation is indicated by the ratings *slight*, *moderate*, *severe*, and *very severe*. The names of the soils

***Figure 15.*—Okeechobee, a growing community, occupies nearly level, sandy soils in low areas, where careful planning is needed to provide complete water control.**

[8] DAVID P. POWELL, soil specialist for interpretation, Soil Conservation Service, assisted in the preparation of this section.

TABLE 7.—*Degree of soil limitation for selected*

[Not included in this table because of their variable characteristic

Group number and map symbol	Building construction	Landscaping	Sanitation	
			Septic tanks and filter fields	Sanitary landfill
Group 1: Pd, Pm	Slight	Severe: Low available water capacity; low to very low natural fertility.	Slight	Moderate: Water table at a depth of 30 to 60 inches.
Group 2: Ad, Fr, Se	Moderate: High water table.	Moderate: Low available water capacity; low natural fertility.	Severe: High water table.	Severe: High water table.
Group 3: Im, My, St	Moderate: High water table; periodic flooding.[1]	Moderate: High water table.	Severe: High water table; periodic flooding.	Severe: High water table; periodic flooding.
Group 4: Br, Ef, Pe, Wa	Moderate: High water table; periodic flooding.	Moderate: High water table; periodic flooding.	Severe: High water table; periodic flooding; moderate to rapid permeability.	Severe: High water table; periodic flooding.
Group 5: Ba, Bc, Bm, Ch, De, Dt, Pf, Pn.	Severe: High water table; frequent flooding.[2]	Severe: High water table; frequent flooding.	Severe: High water table; frequent flooding.	Severe: High water table; frequent flooding.
Group 6: Co, Ff, Fp, Mc, Mo.	Severe: Frequent flooding; high water table; low bearing capacity; high shrink-swell potential in a few areas.	Severe: Frequent flooding; high water table.	Severe: Frequent flooding; high water table; moderate permeability.	Severe: Frequent flooding; high water table.
Group 7: Oe, Pa, Ph, Tc	Very severe: Frequent flooding; high water table; high shrink-swell potential in most areas; low bearing capacity.	Very severe: Frequent flooding; high water table.	Very severe: Frequent flooding; high water table.	Very severe: Frequent flooding; high water table.

[1] Periodic flooding refers to occasional flooding that occurs for short periods during the wet season.

in each group can be found in the "Guide to Mapping Units" at the back of this survey.

The terms used to indicate degree of limitation do not indicate suitability, because suitability involves more than the soil properties. Most soils can be made suitable for many uses if they are managed so that the limitations or hazards are overcome. The ratings do show the degree of intensity of the problems that must be overcome if the soils are used for the purpose indicated. Soils may have severe limitations for a specified use; they can be made suitable for that use, however, if it is feasible to apply the intensive treatment needed to overcome the limitations.

Some properties of soils are significant to only one or two uses; others are significant to a number of uses. Wetness and the hazard of flooding, for example, are important to most uses, but productivity affects only those uses that involve growing plants. In rating the soils for each use shown in table 7, all of the soil properties considered to be important to that particular use were rated. Only the most limiting soil properties are shown, however, and these determine the rating for degree of soil limitation. The other limiting properties are significant and must be considered, but their effect is not so great. The following paragraphs discuss some of the main nonfarm uses of the soils of this county.

Building construction.—Table 7 indicates the degree of soil limitation for soils used for the construction of foundations for buildings. It gives ratings where the soils are to be used for footings and foundations for buildings. The buildings referred to here include dwellings, churches, individual stores of one story in shopping

nonfarm uses and the chief limiting properties

are the land types Borrow pits (Bo), Made land (Ma), and Spoil banks (Sp)]

Transportation		Recreation			Cemeteries
Highways, airports, and large parking lots	Farm roads, streets, and small parking areas	Campsites and picnic areas	Playgrounds	Golf courses	
Slight	Severe: Poor trafficability.	Severe: Poor trafficability; low to very low natural fertility.	Severe: Poor trafficability.	Severe: Poor trafficability; low available water capacity; low to very low natural fertility.	Moderate: Water table at a depth of 30 to 60 inches.
Moderate: High water table.	Moderate: High water table.	Slight	Slight	Slight	Severe: High water table.
Moderate: High water table; periodic flooding.	Moderate: High water table; periodic flooding; fair trafficability.	Moderate: High water table; periodic flooding.	Moderate: High water table; periodic flooding.	Moderate: High water table; periodic flooding.	Severe: High water table; periodic flooding.
Moderate: High water table; periodic flooding; fair traffic-supporting capacity.	Moderate: High water table; periodic flooding; fair trafficability	Moderate: High water table; periodic flooding.	Moderate: High water table; periodic flooding.	Moderate: High water table; periodic flooding.	Severe: High water table; periodic flooding.
Severe: High water table; frequent flooding.	Severe: High water table; frequent flooding; poor trafficability.	Severe: High water table; frequent flooding; poor trafficability.	Severe: High water table; frequent flooding; poor trafficability.	Severe: High water table; frequent flooding; poor trafficability.	Severe: High water table; frequent flooding.
Severe: Frequent flooding; high water table; moderate traffic-supporting capacity.	Severe: High water table; frequent flooding; poor trafficability.	Severe: Frequent flooding; high water table; poor trafficability.	Severe: Frequent flooding; high water table; poor trafficability.	Severe: Frequent flooding; high water table; poor trafficability.	Severe: Frequent flooding; high water table.
Very severe: Frequent flooding; high water table; low traffic-supporting capacity.	Very severe: Frequent flooding; high water table; poor trafficability.	Very severe: Frequent flooding; high water table; poor trafficability.	Very severe: Frequent flooding; high water table; poor trafficability.	Very severe: Frequent flooding; high water table; poor trafficability.	Very severe: Frequent flooding; high water table.

[2] Frequent flooding refers to flooding that occurs for long periods or continuously.

centers, filling stations, and motels. They also include light industrial plants where the buildings are no more than two stories high and where no heavy machinery is to be installed. All of these structures require stable foundations and must also be placed on a site that is reasonably free from the hazards of flooding.

Footings and foundations for buildings must rest on soils that are strong enough to hold the weight of the building. The bearing capacity, that is, the ability of a soil to support a dead weight without settling, is most important in designing and constructing foundations for buildings. The bearing capacity of a soil varies in accordance with differences in such soil properties as texture, consistence, shrink-swell potential, wetness, and the degree of compaction.

Landscaping.—Soils differ widely in their ability to support the various kinds of plants used in landscaping. Lawns and ornamental shrubs are vital to most landscaping efforts. The ability of the soils to support grass as well as ornamental trees and shrubs, is especially important for homesites and for many suburban business establishments. It also has significance for highway beautification and for most recreational uses. Although there is a wide range in the kinds of adapted plants available for landscaping, local variations in the soils limit, to some extent, the kinds that can be grown in a specific area. Properties of soils that most affect landscaping are available water capacity, depth to the water table, productivity, effective root depth, and susceptibility to flooding.

Sanitation.—Soils properties are important in providing public sanitation. Because of the problems in providing

sanitary facilities, wet, marshy soils generally are less healthful areas for man than well-drained soils on ridges.

Septic tanks are a common means of disposing of sewage. They are used for isolated homes in rural areas and in some subdivisions where rapidly expanding residential areas have outgrown the existing sewer lines. For septic tanks to function properly, they must be installed where the soils have adequate absorptive capacity and are not affected by a high water table. Many soils in this county are highly permeable and absorb water rapidly when drained, but they normally have a high water table that makes them poorly suited as filter fields for septic tanks. Septic tanks installed in such soils may function well in dry seasons, but they fail to function when the water table rises in wet seasons. The soil properties that most affect the use of soils as filter fields for septic tanks are wetness, permeability, and susceptibility to flooding.

Sanitary landfill refers to areas used for disposing of refuse collected in urban areas. The refuse is placed in open pits and covered by a layer of soil. Not all soils are suitable for this purpose. Because oxygen is available, decomposition of waste material takes place rapidly in porous, sandy soils that are free of flooding and that do not have a high water table. In soils that have a high water table and are wet, however, decomposition is slow. Organisms in water seeping from these wet areas are likely to pollute nearby surface water or ground water supplies.

Transportation.—Highways, airports, and parking areas for large shopping centers require a strong foundation and nearly level soils. Soils differ widely in their ability to support a heavy mobile load and in the properties they exhibit when they are graded to prepare a uniform, nearly level bed.

Some soils do not require much alteration to provide a good foundation. Others are totally unsuitable for foundations; they must be replaced by better material if a road is to be built on the site. The kinds of soils and the degree of slope greatly influence the difficulty and cost of preparing a foundation adequate for bearing a heavy traffic load.

Soil properties that most affect use of the soils for paved highways, airports, and large parking areas are depth to the water table, traffic-supporting capacity, erodibility, wetness, shrink-swell potential, depth to bedrock, slope, and susceptibility to flooding. Traffic-supporting capacity refers to the ability of the undisturbed soil to support a moving load.

Farm roads, streets, and small parking areas that are not paved carry a lighter load than main highways and larger parking lots, but they are also strongly affected by the soils on which they are located. The ratings in table 7 deal with the limitations of the soils for supporting movement of traffic over unpaved or surface-treated roads. The soil properties that affect these uses, however, are not necessarily the same as those considered for heavier traffic; nor are they given equal weight in each proposed use, even where they apply to both. The qualities of soils that affect unpaved roads, streets, and small parking areas are susceptibility to flooding, depth to the water table, erodibility, trafficability, wetness, permeability, and slope. Trafficability, the major limiting property of soils for this use, refers to the ease with which people can move about over the soil on foot, on horseback, or in a small vehicle, such as a golf cart. It also indicates the ability of the soil to support cross-country movement of larger vehicles, such as trucks and tractors.

Recreation.—In community planning, adequate provisions should be made for recreational areas. Three broad recreational uses are considered in table 7. These are campsites and picnic areas, playgrounds, and golf courses.

Although the interpretations given in table 7 are concerned with the limitations of soils for recreational uses, an important corollary to use of the soils for some recreational purposes is the existence of an attraction that will cause people to choose the site for recreation. Large hammocks near streams or lakes, for instance, make the hammocks desirable for picnic areas even though the soils have some limitations.

Campsites are small areas suitable for setting up tents and for doing the accompanying tasks required for outdoor living over a period of several days. The selection of a campsite commonly is limited by factors other than soil properties. Attractions, such as beautiful scenery, good hunting, fishing, or swimming, are required to interest campers. Accessibility and comfort of a campsite depend greatly on such soil features as wetness, susceptibility to flooding, and trafficability.

Playgrounds, as considered in table 7, include city parks, football and baseball fields, tracks, and other small areas where competitive sports are played outdoors. They must be level or nearly level, free from flooding or excessive wetness, easy to walk over, and suitable for growing sod and ornamental plants. The main qualities that limit use of the soils for playgrounds are wetness, susceptibility to flooding, trafficability, and productivity.

Golf courses can be established on sites where the soils vary widely, if the site has a good balance between fairways and rough areas, or hazards. The requirements for fairways are affected most by the kinds of soils. The ratings in table 7 are based on the suitability of the soils for fairways. A fairway requires well-drained soils, gentle slopes, and a good cover of grass. Also, people must be able to move over the fairway with ease on foot or in a golf cart or other light motor vehicle. The main qualities that limit use of the soils for fairways for golf courses are susceptibility to flooding, depth to the water table, productivity, trafficability, and slope.

Cemeteries.—Cemeteries should be located on well-drained soils that are capable of growing lawn grasses and ornamental plants for landscaping. The water table should be at a depth below 6 feet throughout the year. In all soils in Okeechobee County, the water table is higher than this. As a result, the soils are wet, and sites selected for this use must be artificially drained. Soil properties that most affect the use of soils for cemeteries are wetness, susceptibility to flooding, and productivity.

Formation, Morphology, and Classification of Soils

In this section the factors that affect the formation and the morphology of the soils in Okeechobee County are

discussed. Then the current system of soil classification is explained and the soils are placed in higher categories of this system.

Formation of Soils

Soil is formed by weathering and other processes that act on the parent material. The characteristics of the soil at any given point are determined by parent material, climate, plants, and animals, relief, and time.

Climate and plants and animals are the active forces of soil formation. They act on the parent material that has accumulated through the weathering of rocks and slowly change it into soil. All five factors come into play in the formation of every soil. The relative importance of each differs from place to place; sometimes one is more important and sometimes another. In extreme cases one factor may dominate in the formation of a soil and fix most of its properties. In general, however, it is the combined action of the five factors that determines the present character of each soil.

Parent material.—Parent material is the unconsolidated mass from which a soil is formed. It determines the limits of the chemical and mineralogical composition of the soil.

All of the soils in Okeechobee County formed in material of marine origin. In places the material consists of thick deposits of sand, such as those near Fort Drum. In other places the deposits are thinner and consist of sand over sandy loam and sandy clay loam, such as those near Taylor Creek and in the extreme northeast corner of the county. Also, in some parts of the county, the marine deposits are interbedded with fresh water marl. In addition, many depressions in the county also contain organic material from decomposed plant remains. A thin bed of limestone lies near the surface in places in the southern parts of the county, but it is not the parent material of any of the soils.

Climate.—Okeechobee County has a subtropical, humid climate that presumably has not changed significantly during the period of soil formation. The relatively high year-round temperature and large amount of rainfall have hastened soil development. Because the abundant rainfall continuously leaches and translocates soluble minerals, the soils contain only small amounts of organic matter and of soluble plant nutrients. In addition, many of the sandy soils are strongly acid. The climate is relatively uniform throughout the county and causes few differences among the soils.

Plants and animals.—Plants have been the principal biological factor in the formation of soils in this county, but animals, insects, bacteria, and fungi also have been important. Two of the chief functions of plant and animal life are to furnish organic matter and to bring plant nutrients from the lower to the upper horizons. Differences in the amount of organic matter, nitrogen, and plant nutrients in the soils and differences in soil structure and porosity are among those caused by plants and animals.

The greatest differences among the soils in the county are caused by vegetation. An example is the contrast between soils formed chiefly under pines and palmettos in the broad flatwoods, which generally are medium to low in organic matter, and those formed under grass and aquatic plants in depressions and marshes, which generally are high in organic matter.

Relief.—Relief has affected the formation of soils in this county, primarily through its influence on soil-water relationships. Other factors of soil formation normally associated with relief, such as erosion, temperature, and plant cover, are of minor importance.

The county is mainly a nearly level plain that rises from about 15 feet above sea level on the shores of Lake Okeechobee to about 75 feet above sea level in the north-central part of the county.

Three general areas—flatwoods, slightly elevated knolls and ridges, and flood plains—are in the county. In each of these general areas, differences among the soils, which all formed in similar sandy material, are directly related to relief.

In the flatwoods the water table is at a shallow depth and the soils are periodically wet to the surface. The soils therefore are not so highly leached as those in less wet areas, and their content of organic matter is low to medium. An example is the Myakka soil. In such soils as the Pomello, however, which are on slightly elevated knolls and ridges, depth to the water table is greater. These soils are highly leached and are low in organic matter. In contrast, the Placid soil, in depressions and on flood plains where the water table normally is high, is medium to high in organic matter.

Time.—Time is an important factor in the formation of soils. Normally, a long time is required for formation of soils that have distinct horizons. The difference in length of time that parent materials have been in place commonly is reflected in the degree of development of the soil.

Some basic minerals from which soils are formed weather fairly rapidly, but other minerals change slowly, even though weathering has taken place over a long period of time. The translocation of fine particles within the soils to form the various horizons varies under different conditions. All of the soil-forming processes, however, require a relatively long period of time. Almost pure quartz sand that is highly resistant to weathering is the dominant geologic material in Okeechobee County. The finer textured materials, silts and clays, are the end product of earlier weathering.

In terms of geologic time, the soil material that makes up most of the soils of this county is young. Not enough time has elapsed since the material was laid down or emerged from the sea for pronounced genetic horizons to have developed. Some thin clayey horizons have formed in place through the processes of weathering, but most horizons classified as argillic are composed of loamy marine deposits little altered by weathering. Distinct genetic horizons, such as spodic and mollic, have formed in certain soils in the county, however, since the time required for their development is relatively short.

Morphology of Soils

Soil morphology refers to the processes involved in the formation of soil horizons, or horizon differentiation. The differentiation of horizons in soils of the county is the result of accumulation of organic matter, the leach-

ing of carbonates, the reduction and transfer of iron, the accumulation of silicate clay minerals, or of more than one of these processes.

Some organic matter has accumulated in the upper layers of most of the soils to form an A1 horizon. The quantity of organic matter is small in some of the soils but fairly large in others.

Leaching of carbonates and salts has occurred in nearly all of the soils. The effects of leaching have been indirect, in that the leaching permitted the subsequent translocation of silicate clay materials in some soils. Most of the soils of the county are leached to varying degrees.

The reduction and transfer of iron has occurred in most soils of the county. In these naturally wet soils, this process, called gleying, is important in the differentiation of horizons. The gray colors in the deeper horizons of wet soils indicate the reduction and loss of iron oxides. In some of the wet soils, iron has been segregated within the deeper horizons to form reddish-brown mottles and concretions.

In some of the soils in this county the translocation of clay has contributed to the development of horizons. Some soils show evidence of weathering and clay movement, or alteration, in the form of a light-colored, leached, A2 horizon; a loamy Bt horizon that has sand grains coated and bridged by clay materials; and patchy clay films on ped faces and in root channels. In a few soils a thin B1 horizon that is intermediate in texture between the A2 and the B2t horizons is also present.

Classification of Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

Thus in classification, soils are placed in narrow categories that are used in detailed soil surveys so that knowledge about the soils can be organized and used in managing farms, fields, and woodland; in developing rural areas; in engineering works; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas, such as countries and continents.

Two systems of classification have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and later revised (*4*). The system currently used was adopted for general use by the National Cooperative Soil Survey in 1965. The current system is under continual study (*3*, *7*). Therefore, readers interested in developments of the current system should search the latest literature available. In table 8 the soil series of Okeechobee County are placed in some categories of the current system.

The current system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that soils of similar origin are grouped together. The classes of the current system are briefly defined in the paragraphs that follow.

TABLE 8.—*Classification of soils*

Series	Family	Subgroup	Order
Adamsville	Siliceous, hyperthermic, uncoated	Aquic Quartzipsamments	Entisols.
Basinger	Siliceous, hyperthermic, uncoated	Aquodic Quartzipsamments	Entisols.
Bradenton	Coarse-loamy, mixed, hyperthermic	Typic Ochraqualfs	Alfisols.
Charlotte	Sandy, siliceous, hyperthermic	Entic Sideraquods	Spodosols.
Chobee	Fine-loamy, mixed, noncalcareous, hyperthermic	Typic Argiaquolls	Mollisols.
Delray	Loamy, mixed, noncalcareous, hyperthermic	Grossarenic Argiaquolls	Mollisols.
Elred	Sandy over loamy, siliceous, hyperthermic	Alfic Sideraquods	Spodosols.
Felda	Loamy, mixed, hyperthermic	Arenic Ochraqualfs	Alfisols.
Ft. Drum	Sandy, siliceous, hyperthermic	Aeric Haplaquepts	Inceptisols.
Immokalee	Sandy, siliceous, hyperthermic	Arenic Haplaquods	Spodosols.
Manatee	Coarse-loamy, mixed, noncalcareous, hyperthermic	Typic Argiaquolls	Mollisols.
Myakka	Sandy, siliceous, hyperthermic	Aeric Haplaquods	Spodosols.
Okeelanta	Sandy, siliceous, euic, hyperthermic	Terric Medihemists	Histosols.
Pamlico [1]	Sandy, siliceous, dysic, thermic	Terric Medisaprists	Histosols.
Paola	Siliceous, hyperthermic, uncoated	Spodic Quartzipsamments	Entisols.
Parkwood	Coarse-loamy, mixed, hyperthermic	Mollic Ochraqualfs	Alfisols.
Placid	Sandy, siliceous, hyperthermic	Typic Humaquepts	Inceptisols.
Pomello	Sandy, siliceous, hyperthermic	Typic Haplohumods	Spodosols.
Pompano	Siliceous, hyperthermic	Typic Psammaquents	Entisols.
Seewee [1]	Mixed, thermic	Aquic Udipsamments	Entisols.
St. Johns	Sandy, siliceous, hyperthermic	Typic Haplaquods	Spodosols.
Terra Ceia	Euic, hyperthermic	Typic Medisaprists	Histosols.
Wabasso	Sandy over loamy, siliceous, hyperthermic	Alfic Haplaquods	Spodosols.

[1] These soils are taxadjuncts of the Pamlico and Seewee soils because of soil temperature. The average annual soil temperature is about 2° F. warmer than the limit for thermic soils.

ORDERS.—Ten soil orders are recognized. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate these soil orders are those that tend to give broad climatic groupings of soils. Two exceptions, the Entisols and Histosols, occur in many different kinds of climates. The six orders in Okeechobee County are Alfisols, Entisols, Histosols, Inceptisols, Mollisols, and Spodosols.

Alfisols are soils that have a clay-enriched B horizon that has high base saturation. These soils formed in materials that were little affected by weathering.

Entisols are young mineral soils that do not have genetic horizons or have only the beginning of such horizons.

Histosols are highly organic soils that formed in marshes and swamps where organic matter from decaying plants accumulated.

Inceptisols are mineral soils in which horizons have definitely started to develop. They generally are on young, but not recent, land surfaces.

Mollisols have a thick, friable, dark-colored surface layer. Base saturation is more than 50 percent.

Spodosols are mineral soils in which organic colloids and iron and aluminum compounds have accumulated in some part of the B horizon.

SUBORDERS.—Each order is subdivided into groups (suborders) that are based mostly on soil characteristics that seem to produce classes having the greatest similarity from the standpoint of their geneses. Suborders narrow the broad climatic range that are in the orders.

Soil characteristics used to separate suborders mainly reflect either the presence or absence of waterlogging or soil differences produced through the effects of climate or vegetation. The names of suborders have two syllables, the last syllable of which indicates the order. An example is Psamments (Psamm, from psammes meaning sandy, and ent, from Entisol).

GREAT GROUPS.—Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of all major soil horizons and other features. The horizons used as a basis for distinguishing between great groups are those in which (1) clay, iron, or humus has accumulated; (2) a pan has formed that interferes with growth of roots; movement of water, or both; or (3) a thick, dark-colored surface layer has formed. The other features commonly used are the self-mulching properties of clay, temperature of the soil, major differences in chemical composition (mainly the bases calcium, magnesium, sodium, and potassium) or the dark-red or dark-brown colors associated with soils formed in material weathered from basic rocks.

Names of the great groups have three or four syllables. They are made by adding a prefix to the name of the suborder. An example is Quartzipsamment (Quartz, meaning silica; psammes, for sandy; and ent, from Entisol). The great group is not shown separately in table 8, because it is the last word in the name of the subgroup.

SUBGROUPS.—Great soil groups are subdivided into subgroups. One of these represents the central, or typic, segment of the group. Other subgroups have properties of the group but have one or more properties of another great group, suborder, or order and these are called intergrades. The names of subgroups are formed by placing one or more adjectives before the name of the great group. An example is Spodic Quartzipsamment.

FAMILIES.—Families are separated within a subgroup, primarily on the basis of properties that are important to the growth of plants or to the behavior of soils used for engineering. The main properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. The names of families consist of a series of adjectives that precede the name of the subgroup. The adjectives are the class names for texture, mineralogy, and so on, (see table 8). An example is the siliceous, hyperthermic family of Typic Psammaquents.

SERIES.—The series consists of a group of soils that formed from a particular kind of parent material and that have genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile. Among these characteristics are color, structure, reaction, consistence, and mineralogical and chemical composition.

New soil series must be established and concepts of some established series, especially older ones that have been used little in recent years, must be revised in the course of the soil survey program across the country. A proposed new series has tentative status until review of the series concept at State, regional, and national levels of responsibility for soil classification results in a judgment that the new series should be established. Most of the soil series described in this publication have been established earlier.

General Nature of the County

In this section the geology and climate of the county are discussed. Then basic facts about the farming are given.

The first permanent settlements in the county were established in the late 1800's. These were the communities of Basinger, near the Kissimmee River, and Fort Drum, in the northeastern part of the county. The community of Tantie, later called Okeechobee, was established near Lake Okeechobee in the early 1900's.

The area was established as Okeechobee County in 1917 from parts of Osceola, St. Lucie, and Palm Beach Counties. Following devastating hurricanes in 1926 and 1928, Hoover Dike was constructed around parts of Lake Okeechobee to keep the lake from flooding parts of the county. The dike provides protection for most of the southern part of the county. As a result, many more people settled in the county. Most of the population now lives in or near the city of Okeechobee, and the Florida State School for Boys is about 3 miles north of this city.

Most early transportation in the county was by way of the Kissimmee River. Railroads soon gave the county access to markets both to the north and to the south. Now the county also is served by Federal and State highways. Most of the industry is related to farming, though there is considerable seasonal tourist business.

Geology [9]

Four main geologic formations are in Okeechobee County (fig. 16). These are, from the oldest to the youngest, the Caloosahatchee formation of early Pleistocene age, the Fort Thompson formation of late Pleistocene age, terraces of ice age of the same time, and deposits of Recent age.

The Caloosahatchee formation consists primarily of shells and sand, but it includes small amounts of silt and clay. It is of marine origin and is as much as 50 feet thick. In places the formation is capped by more recent material laid down in alkaline fresh water. In many places 50 to 75 percent of the Caloosahatchee formation, by volume, is loose shells and shell fragments. The formation underlies the entire county at a depth of 3 to 40 feet. It is near enough to the surface to influence soil development only in a narrow area around the northern edge of Lake Okeechobee and in the northeastern corner of the county. In this material formed such soils as the Chobee, Delray, Manatee, and Parkwood.

The Fort Thompson formation extends only a few miles north of Lake Okeechobee. It is 4 to 10 feet thick. Much of this formation is near enough to the surface to have influenced soil development. Some areas, however, have a thin capping of stratified sand of the Pamlico terrace. The Fort Thompson formation was laid down at three different sea levels. It is made up of alternate beds of fresh-water marl and marine shells. This bedding can be correlated with the glacial and interglacial periods with which the terraces of ice age are associated. Lake Okeechobee is in a basin in the Fort Thompson formation.

Material laid down during the ice age forms four terraces that are in Pleistocene time and rest upon the Caloosahatchee and Fort Thompson formations (fig. 17). The Pamlico terrace ranges from 0 to 25 feet above sea level; the Talbot, from 25 to 42 feet; the Penholoway, from 42 to 70 feet; and the Wicomico, the highest elevation in the county, from 70 to 75 feet. The terraces formed during the period of interglacial submergence. Scattered pockets of muck and peat in many depressions and along some of the streams on these upland terraces are of Recent age.

The Pamlico terrace occupies about 10 percent of the county. It consists mostly of sand and ranges from less than 1 foot to about 10 feet in thickness. In many places the deposits are only 1 to 3 feet thick and rest unconformably upon the Fort Thompson and Caloosahatchee formations. Because it is in close contact with these formations, more of the soils on the Pamlico terrace are nonacid than are those on the other terraces. Common on this terrace are such soils as the Adamsville, Bradenton, Charlotte, Felda, and Pompano. Also common are such soils as the Wabasso, which has an upper layer of acid sand and a subsoil of nonacid loamy material.

About 32 percent of the county is on the Talbot terrace. This terrace consists chiefly of medium sand, and it is no more than 15 feet thick. Many soils of the Talbot terrace appear to be alkaline soils that are transitional between marine and fresh water soils. The important nonacid soils on this terrace are the Bradenton, Felda, Parkwood, and Wabasso. The Myakka and Immokalee are the dominant acid soils on this terrace.

The Penholoway terrace covers about 50 percent of

[9] L. Orlando Rowland, geologist, and David P. Powell, soil specialist for interpretation, Soil Conservation Service, assisted in preparation of this section.

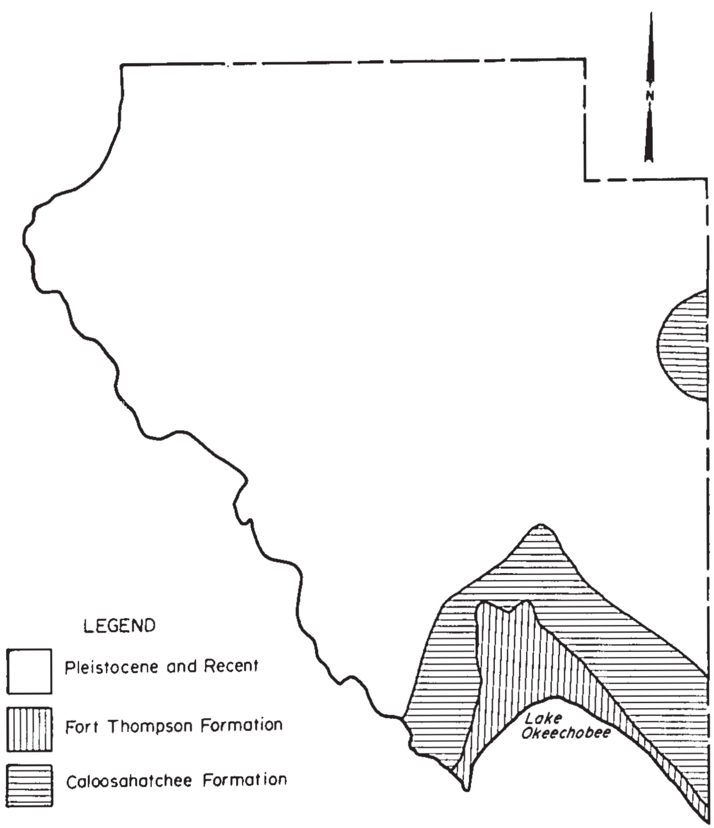

Figure 16.—**Geological map of Okeechobee County.**

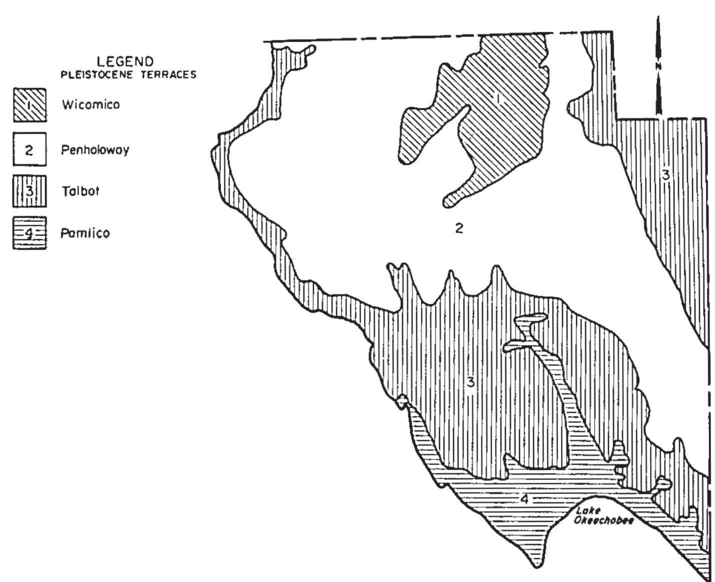

Figure 17.—**Location of Pleistocene terraces in Okeechobee County.**

the county. It consists chiefly of medium sand. Thickness of this terrace ranges from 10 to 20 feet. In some places the sand rests on the Caloosahatchee formation. Most of the soils that formed on the Penholoway terrace are acid in reaction. Evidence indicates this acidity was caused by the decay of large amounts of organic matter, high in sulphur and sulphides, that had accumulated in large shallow salt marshes that remained on the terrace after the sea subsided. Alkaline soils are also on this terrace. They occur mainly in or near shallow depressions where fresh-water marl has accumulated.

The Wicomico terrace is in the north-central part of the county and occupies only about 8 percent of it. Unlike the Penholoway and Talbot terraces only a part of the Wicomico terrace remains, possibly no more than 3 to 5 feet. The dominant soils are acid. Examples are the Paola, Pomello, and Myakka. Many shallow depressions occur in this formation where fresh water marl has accumulated. Alkaline soils that formed in these deposits include the Delray, Felda, Parkwood, and Pompano.

The mapping of individual soils was not confined to a particular geologic formation or marine terrace, because of the geologic sediment and other factors affecting soil formation are similar so far as can be determined in the field. For example, Parkwood soils mapped in fresh-water alkaline deposits on the upland terraces are very similar to Parkwood soils mapped in alkaline marine sediment of the Caloosahatchee formation. Variations in characteristics were recognized in the field, but they were not considered significant to final correlation. An understanding of the geology of the county and its effects on soil formation, however, is helpful in explaining the wide ranges of certain soil characteristics. It also explains some of the complex soil patterns that occur in many parts of the county.

Climate [10]

Okeechobee County has long, warm, relatively humid summers and mild, dry winters. The average annual rainfall is about 50 inches and the average annual temperature is about 73° F. Rainfall is seasonally distributed; about 60 percent of the average total falls in the summer rainy season, which extends from June through September. The Atlantic Ocean, Gulf of Mexico, and Lake Okeechobee all have a moderating effect on the extreme temperatures of both summer and winter.

The temperature in summer varies little from day to day, and a temperature as high as 100° is rare. In winter the minimum temperature varies considerably from day to day, largely because of periodic invasions of cold, dry air from Canada. Facts about temperature and precipitation in the county, taken from records at Okeechobee and Fort Drum, are given in table 9.

The farming areas in the colder parts of the county can expect freezing temperatures at least once in almost every winter. In an average winter freezing temperatures occur on about 6 days, and the temperature drops to 28° or lower at least once or twice. Winter cold spells generally last for only 2 or 3 days at a time. Variations in the local climate around the county are of greater significance to the growing of winter truck crops or citrus than are general cold spells. Pockets or depressions in the landscape that lack air drainage are called "cold spots." Cold air that settles in such areas nightly for several hours can seriously damage tender vegetable crops and citrus.

Table 10 gives probabilities of the occurrence of temperatures of 28°, 32°, 34°, 38°, and 42° after stated dates

[10] By JACK E. MICKELSON, State climatologist, Florida Weather Bureau, ESSA, U.S. Department of Commerce.

TABLE 9.—*Temperature and precipitation*

[Based on data recorded at Okeechobee and Fort Drum, Fla.]

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	Average monthly highest maximum	Average monthly lowest minimum	Average monthly total	1 year in 10 will have—		Average number of days with rainfall of—	
						Less than—	More than—	0.10 inch	0.50 inch
	° F.	*° F.*	*° F.*	*° F.*	*Inches*	*Inches*	*Inches*	*Number*	*Number*
January	74	50	84	29	1.5	0.1	4.8	4	1
February	76	53	85	35	2.0	.2	4.3	6	2
March	79	56	88	38	3.5	.3	5.9	5	2
April	84	58	91	45	3.3	.6	7.3	4	2
May	88	63	95	52	4.3	.7	7.5	6	2
June	90	68	95	61	7.0	2.3	11.5	10	5
July	92	70	97	67	7.0	2.9	10.1	10	4
August	92	71	96	66	6.4	2.5	10.5	11	5
September	90	70	94	65	7.3	3.7	15.3	8	4
October	85	64	92	50	4.9	.7	10.3	7	3
November	80	57	86	42	1.6	.2	3.6	3	1
December	74	50	84	31	1.5	.1	4.5	3	1
Year	84	61	[1] 98	[2] 26	50.3	36.0	63.4	77	32

[1] Average annual highest maximum.
[2] Average annual lowest minimum.

TABLE 10.—*Probabilities of last freezing temperatures in spring and first in fall*

[Based on records at the ESSA Weather Bureau station about 5 miles northwest of Fort Drum]

Probability	Dates for given probability and temperature—				
	28° F. or lower	32° F. or lower	34° F. or lower	38° F. or lower	42° F. or lower
Spring:					
1 year in 10 later than	January 31	March 6	March 6	April 14	May 1
2 years in 10 later than	January 29	February 26	February 26	March 23	April 17
5 years in 10 later than	January 13	January 24	February 1	March 9	March 22
Fall:					
1 year in 10 earlier than	December 12	November 30	November 30	November 4	November 4
2 years in 10 earlier than	December 13	December 11	November 30	November 30	November 5
5 years in 10 earlier than	December 15	December 25	December 14	December 2	November 29

in spring and before stated dates in fall. The table shows, for example, that a temperature of 32° or lower will occur on March 6th in 1 year out of 10 and that the probability of a temperature of 28° or lower after this date is almost negligible.

Rainfall in summer comes mostly from showers and thundershowers of short duration that occur in the afternoon or in the evening. The showers are sometimes heavy, and 2 or 3 inches of rain is likely to fall in an hour or two. Rains that last all day are rare in summer; when they occur, they are almost always associated with a tropical storm. Rains in winter and spring generally are not so intense as in summer. Almost 8 inches of rain can be expected in 24 hours at some time during the year in only about 1 year in 10.

Hail falls occasionally during a thundershower. The hail generally is small, however, and seldom causes much damage. Snow has never been recorded in Okeechobee County.

Tropical storms, which are likely to occur in the county from early in June through the middle of November, are the main cause of excessive rain and flooding. Since these storms diminish in force as they move inland, winds of hurricane force (74 miles per hour or greater) seldom occur in this county. When these storms and the associated copious rains do occur, flooding may cause considerable damage to the crops and to the soils.

Extended dry periods may occur during any season but are most common during winter and spring. November generally is the driest month, though November through February is considered the dry season. Because the soils in this county generally are sandy and have low water-holding capacity, these dry periods can cause serious hazards in farming areas that are not properly irrigated. Generally dry periods in April and May do not last so long as those in fall and winter, but they could affect crops. Because they are accompanied by high temperature, dry periods in spring are as serious as those that occur at other times.

Prevailing winds in this county generally are from the southeast in spring and summer and from the north in fall and winter. The speed of the wind generally ranges from 8 to 15 miles per hour during the day; it generally drops to less than 5 miles per hour at night.

Farming

Farming started in Okeechobee County fairly recently. The first orange groves were set out on a few homesteads near Fort Drum in the late 1800's. A severe freeze in 1895, however, killed most of the orange trees in these groves, and no replanting was done. The early settlers grew truck crops in small patches near Lake Okeechobee, mainly for local use. Until about 1945 the only important enterprises in the county were the raising of cattle and the harvesting of native timber. Cattle were grazed on native range and little was done to upgrade either the cattle or the range. Most of the original stands of timber were harvested before 1930.

After World War II the number of farms in the county rapidly increased. Many of the local people who were employed in ranching, fishing, or lumbering turned to farming. The nearly level soils were easy to clear, and the mild winter climate favored use of the area for truck farming.

Tomatoes and watermelons are now the main cultivated crops, and they have been grown commercially since about 1948. Tomatoes are grown both in fall and in spring. They are marketed at Ft. Pierce in adjacent St. Lucie County. Watermelons are grown only in spring and are sold to buyers who ship them to markets in the northern part of the country.

Tomatoes are subject to many soil-borne diseases and to nematodes, all of which are easier to move away from than to control. They therefore are not planted successively on the same piece of land. A good arrangement between growers and landowners has developed. The grower leases the land with the agreement that he will plant improved grasses after the crop is harvested and before the land is returned to the owner. In this way the grower can produce a crop of tomatoes each year on different land and not have to own it, and the landowner can get additional acreage of improved pasture each year at little cost.

Citrus is now grown on a considerable acreage in the county, and most of the acreage is in orange trees (fig. 18). Much of the acreage in citrus is on nonacid soils, such as the Bradenton and Parkwood. Less than 300 acres is on the better drained, acid Paola soil near Fort

Figure 18.—**Young orange trees planted in beds on Bradenton and Wabasso soils; the grassed waterways between the beds help to protect the soils from erosion by wind and water.**

Drum, Osowaw Junction, and Basinger. Only a few groves are now on soils in the acid flatwoods, but the number is increasing.

The raising of livestock continues to be the chief farm enterprise. Some of the livestock farms are as small as a few hundred acres, and others are as large as 61,000 acres. In 1967, according to local sources, about 121,000 acres of improved pasture were in the county (fig. 19). The same year about 174,780 acres of native range and 154,000 acres of woodland were also grazed. Many of the native plants best suited to grazing have disappeared because of overgrazing and frequent burning. The more desirable forage plants can be encouraged if brush is controlled and if grazing is deferred for a full season.

The livestock generally is sold at the market in Okeechobee, the largest in the State. This market was built to handle 1,500 head of livestock per week, but the number marketed often is as high as 2,500 per week.

Dairy farming has increased in the county in recent years. Many of the operators came to the county from the lower part of the east coast in the 1950's because land could be purchased at a more favorable price. In 1967, according to local sources, 22 dairy farms were in

Figure 19.—**Beef cattle grazing on improved pasture of irrigated pangolagrass.**

Figure 20.—**Dairy cattle grazing improved pasture on Myakka and Immokalee soils in the flatwoods.**

the county, and they occupied about 30,000 acres. The average size of each dairy farm was about 1,500 acres, though the size ranged from 184 to about 12,600 acres. Most of the dairy farms are on large areas of soils in the flatwoods. Here pastures can be established readily under a high level of management (fig. 20).

Literature Cited

(1) American Association of State Highway Officials.
1961. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 8, 2 v., Washington, D.C.

(2) Baldwin, Mark, Kellogg, Charles E., and Thorp, James.
1938. SOIL CLASSIFICATION. Soils and Men, U.S. Dept. Agr. Ybk. 979–1001.

(3) Simonson, Roy W.
1962. SOIL CLASSIFICATION IN THE UNITED STATES. Sci. 137: 1027–1034.

(4) Thorp, James, and Smith, Guy D.
1949. HIGHER CATEGORIES OF SOIL CLASSIFICATION: ORDER, SUBORDER, AND GREAT SOIL GROUPS. Soil Sci. 67: 117–126.

(5) United States Department of Agriculture.
1929. VOLUME, YIELD, AND STAND TABLES FOR SECOND-GROWTH SOUTHERN PINES. Misc. Pub. No. 50, 202 pp., illus. (Out of print.)

(6) ———
1951. SOIL SURVEY MANUAL. U.S. Dept. Agr. Handbook No. 18, 503 pp., illus.

(7) ———
1960. SOIL CLASSIFICATION, A COMPREHENSIVE SYSTEM, 7TH APPROXIMATION. 265 pp., illus. [Supplement issued in March 1967]

(8) Waterways Experiment Station, U.S. Corps of Engineers.
1953. THE UNIFIED SOIL CLASSIFICATION SYSTEM. Tech. Memo. 3–357, 2 v., and appendix.

Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Available moisture capacity. The capacity of a soil to hold water in a form available to plants. Amount of moisture held in soil between field capacity, or about one-third atmosphere of tension, and the wilting coefficient, or about 15 atmospheres of tension.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Gleization. The reduction, translocation, and segregation of soil compounds, notably of iron, usually in the lower horizons, as a result of waterlogging with poor aeration and drainage; expressed in the soil by mottled colors dominated by gray. The soil-forming processes leading to the development of a gley soil.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused by (1) accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of 1, 2, or 3. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Internal drainage. The downward movement of water through the soil profile. The rate of movement is determined by the texture, structure, and other characteristics of the soil profile and underlying layers, and by the height of the water table, either permanent or perched.

Relative terms for expressing internal drainage are *none, very slow, slow, medium, rapid,* and *very rapid.*

Leaching. The removal of soluble materials from soils or other material by percolating water.

Miscellaneous land type. A mapping unit for areas of sand that have little or no natural soil; or that are too nearly inaccessible for orderly examination; or that occur where, for other reasons, it is not feasible to classify the soil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineralogical, and biological properties of the various horizons, and their thickness and arrangement in the soil profile.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Natural soil drainage. Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Imperfectly or somewhat poorly drained soils are wet for significant periods but not all the time, and in Podzolic soils commonly have mottlings below 6 to 16 inches, in the lower A horizon and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Parent material (soil). The horizon of weathered rock or partly weathered soil material from which soil has formed; horizon C in the soil profile.

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

pH value. A numerical means for designating relatively weak acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value alkalinity; and a lower value, acidity.

Poorly graded. A soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles in poorly graded soil material, density can be increased only slightly by compaction.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Range condition. The state of health or productivity of both soil and forage in a given range, in terms of what productivity could or should be under normal climate and the best practical management. Condition classes generally recognized are—*excellent, good, fair,* and *poor.* The classification is based on the percentage of original, or climax, vegetation on the site, as compared to what ought to grow on it if management were good.

Range site. An area of range where climate, soil, and relief are sufficiently uniform to produce a distinct kind of climax vegetation.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Series, soil. A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Site index. A numerical means of expressing the quality of a forest site that is based on the height of the dominant stand at an arbitrarily chosen age; for example, the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles, less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *Very coarse sand* (2.0 to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter). The separates recognized by the International Society of Soil Science are as follows: I (2.0 to 0.2 millimeter); II (0.2 to 0.02 millimeter); III (0.02 to 0.002 millimeter); IV (less than 0.002 millimeter).

Soil variant. A soil having properties sufficiently different from those other known soils to suggest establishing a new soil series, but a soil of such limited known area that creation of a new series is not believed to be justified.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically the part of the soil below the solum.

Surface layer. A term used in nontechnical soil descriptions for one or more layers above the subsoil. Includes the A horizon and part of the B horizon; has no depth limit.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Well-graded soil. A soil or soil material consisting of particles that are well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

U.S. GOVERNMENT PRINTING OFFICE: 1970

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. In referring to a capability unit or range site, read the introduction to the section it is in for general information about its management.

In the columns listing capability units, range sites, woodland groups, and nonfarm groups, dashes mean that the particular mapping unit is not placed in a group. Other information is given in tables as follows:

Acreage and extent, table 1, p. 7.
Predicted yields, table 2, p. 30.
Woodland, table 3, p. 35.
Engineering uses of the soils, tables 4, 5, and 6, pp. 38 through 47.
Nonfarm uses, table 7, p. 50.

			Capability unit		Range site		Woodland group	Nonfarm group
Map symbol	Mapping unit	Page	Symbol	Page	Name	Page	Number	Number
Ad	Adamsville fine sand	7	IVw-1	27	Sweet Flatwoods 1/	33	2	2
Ba	Basinger fine sand	8	IVw-3	28	Slough	33	7	5
Bc	Basinger-Placid complex	8	Vw-1	29	Sand Pond	32	7	5
Bm	Basinger and Pompano fine sands, ponded	9	Vw-1	29	Sand Pond	32	7	5
Bo	Borrow pits	9	------	--	-----------------	--	-	-
Br	Bradenton fine sand	9	IIIw-1	25	Sweet Flatwoods 1/	33	3	4
					Hammock 1/	32		
Ch	Charlotte fine sand	10	IVw-3	28	Slough	33	7	5
Co	Chobee fine sandy loam	10	IIIw-4	26	Sand Pond	32	5	6
De	Delray fine sand	11	IIIw-5	26	Sand Pond	32	7	5
					Slough	33		
Dt	Delray fine sand, thin solum variant	11	IIIw-5	26	Slough	33	7	5
Ef	Elred fine sand	12	IIIw-4	26	Slough	33	7	4
Ff	Felda fine sand	12	IIIw-4	26	Slough	33	7	6
Fp	Felda, Pompano, and Placid soils, ponded	13	IIIw-4	26	Sand Pond	32	7	6
Fr	Ft. Drum fine sand	13	IVw-1	27	Sweet Flatwoods 1/	33	2	2
					Hammock 1/	32		
Im	Immokalee fine sand	14	IVw-2	28	Acid Flatwoods 1/	31	4	3
Ma	Made land	14	------	--	-----------------	--	-	-
Mc	Manatee loamy fine sand	14	IIIw-4	26	Sand Pond	32	5	6
Mo	Manatee, Delray, and Okeelanta soils	15	IIIw-4	26	Fresh Marsh	31	5	6
My	Myakka fine sand	15	IVw-2	28	Acid Flatwoods 1/	31	4	3
Oe	Okeelanta peat	16	IIIw-6	27	Everglades Marsh	31	8	7
Pa	Pamlico muck	17	IIIw-6	27	Swamp 1/	33	8	7
Pd	Paola fine sand	17	IIIs-1	27	Sand Scrub 1/	32	1	1
Pe	Parkwood fine sand	18	IIIw-2	25	Hammock 1/	32	6	4
Pf	Placid fine sand	19	IIIw-5	26	Sand Pond	32	7	5
Ph	Placid, Pamlico, and Delray soils, ponded	19	VIIw-1	29	Swamp 1/	33	7	7
Pm	Pomello fine sand	19	VIs-1	29	Sand Scrub 1/	32	1	1
Pn	Pompano fine sand	20	IVw-3	28	Slough	33	7	5
Se	Seewee fine sand	20	IIIs-1	27	Hammock 1/	32	1	2
Sp	Spoil banks	21	------	--	---------------	--	-	-
St	St. Johns sand	21	IIIw-3	26	Acid Flatwoods 1/	31	4	3
Tc	Terra Ceia peat	21	IIIw-6	27	Everglades Marsh	31	8	7
Wa	Wabasso fine sand	22	IIIw-1	25	Sweet Flatwoods 1/	33	3	4

1/ The climax potential of this site is trees.

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Supplemental Nutrition Assistance Program

For additional information dealing with Supplemental Nutrition Assistance Program (SNAP) issues, call either the USDA SNAP Hotline Number at (800) 221-5689, which is also in Spanish, or the State Information/Hotline Numbers (http://directives.sc.egov.usda.gov/33085.wba).

All Other Inquiries

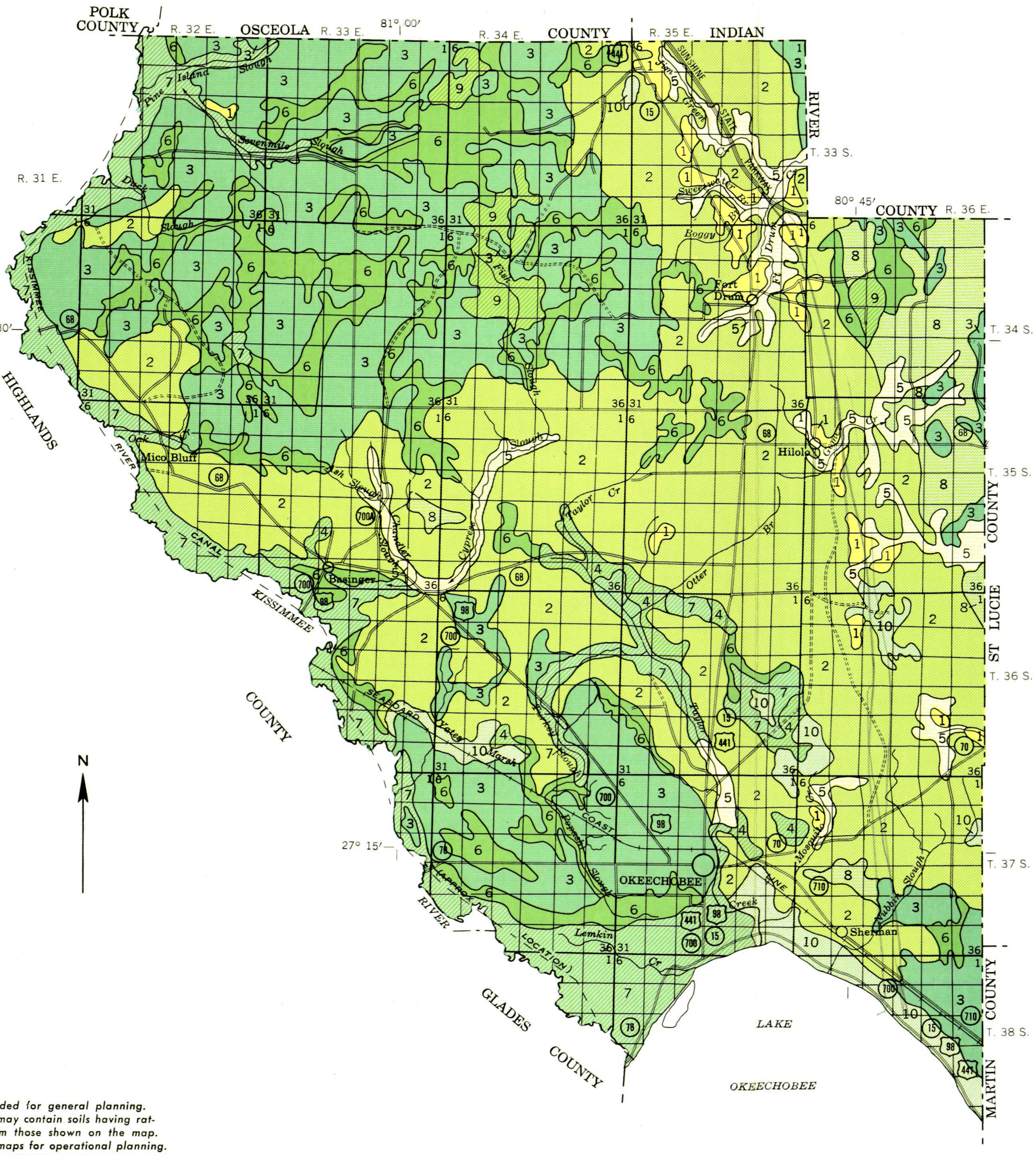
For information not pertaining to civil rights, please refer to the listing of the USDA Agencies and Offices (http://directives.sc.egov.usda.gov/33086.wba).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

UNIVERSITY OF FLORIDA
AGRICULTURAL EXPERIMENT STATIONS

GENERAL SOIL MAP

OKEECHOBEE COUNTY, FLORIDA



1 0 1 2 3 4 Miles
Scale 1:253,440

SOIL ASSOCIATIONS

1	Pomello-Paola association: Nearly level, moderately well drained soils that are sandy to a depth of more than 40 inches; on low knolls and ridges.
2	Myakka-Basinger association: Nearly level, poorly drained soils that are sandy to a depth of more than 40 inches and have an organic pan at a depth of 10 to 30 inches; on broad flatwoods and open prairies and in scattered grassy sloughs and isolated depressions.
3	Immokalee-Pompano association: Nearly level, poorly drained soils that are sandy to a depth of more than 40 inches; organic pan at a depth of 30 to 48 inches in most places; on broad flatwoods and in scattered grassy sloughs and depressions.
4	Parkwood-Bradenton-Wabasso association: Nearly level, poorly drained, sandy soils that have a loamy or marly layer at a depth of less than 40 inches; on palm hammocks and the interspersed pine flatwoods.
5	Placid-Pamlico-Delray association: Nearly level, very poorly drained soils that are sandy to a depth of more than 40 inches and organic soils; in swamps and heavily wooded drainageways.
6	Pompano-Charlotte-Delray-Immokalee association: Nearly level, mainly poorly drained soils that are sandy to a depth of more than 40 inches; in broad grassy sloughs and depressions and on small scattered palmetto flats.
7	Manatee-Delray-Okeelanta association: Nearly level, very poorly drained, sandy soils that in most places have a loamy layer at a depth of less than 40 inches and organic soils; on flood plains of major streams and other lowlands.
8	Felda-Wabasso association: Nearly level, poorly drained, sandy soils that have a loamy layer at a depth of less than 40 inches; in grassy sloughs and depressions and on scattered, slightly elevated islands of flatwoods.
9	Felda-Pompano-Parkwood association: Nearly level, poorly drained, sandy soils that have a loamy subsoil and deep sands, in sloughs and marshes; interspersed with poorly drained sandy soils that are shallow to marl and are on palm hammocks.
10	Okeelanta-Delray-Pompano association: Nearly level, very poorly drained organic soils in broad sawgrass marshes and the adjacent wet sandy soils.

November 1970

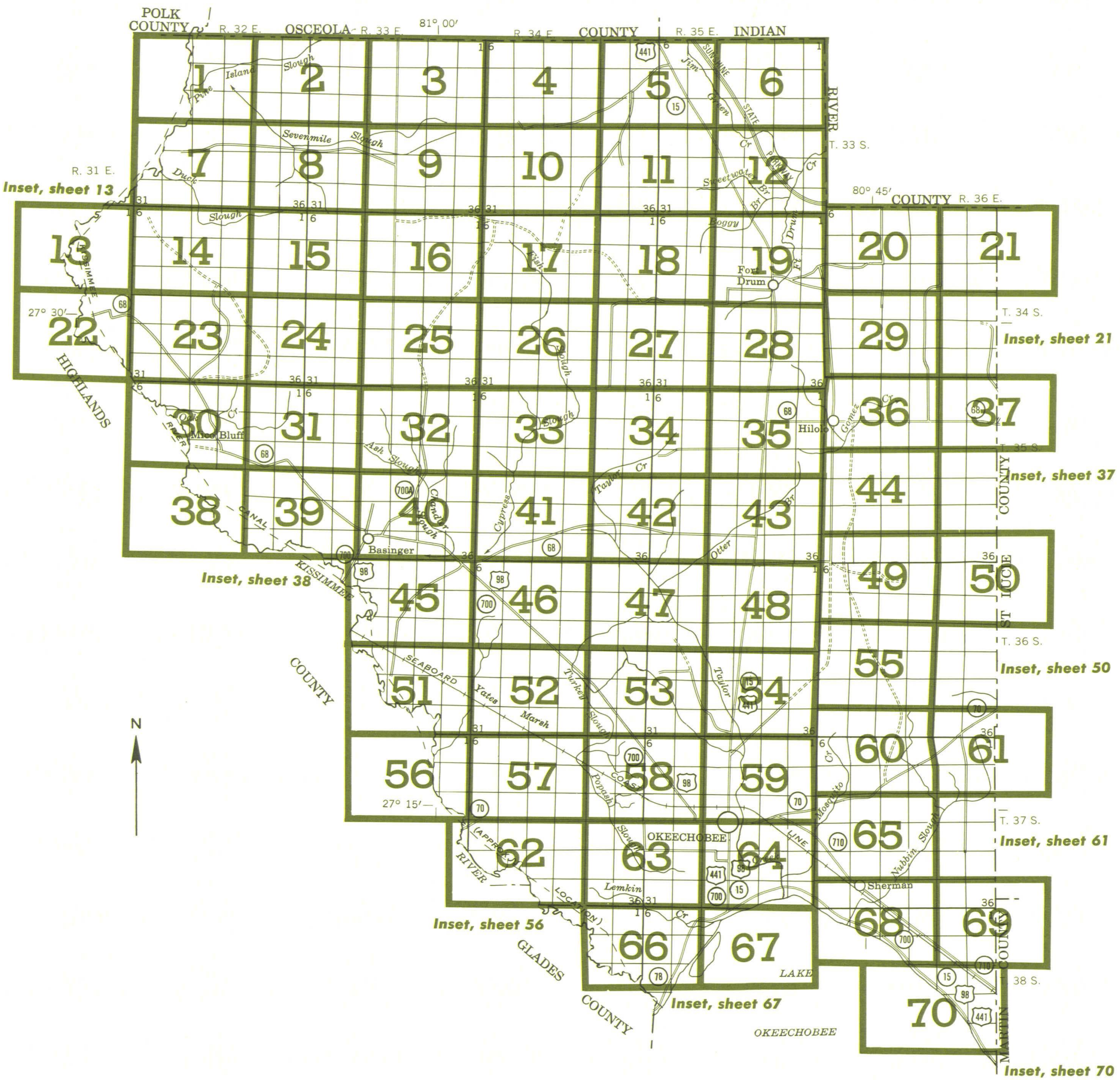
NOTE—
This map is intended for general planning. Each delineation may contain soils having ratings different from those shown on the map. Use detailed soil maps for operational planning.

INDEX TO MAP SHEETS

OKEECHOBEE COUNTY, FLORIDA

1 0 1 2 3 4 Miles

Scale 1:253,440



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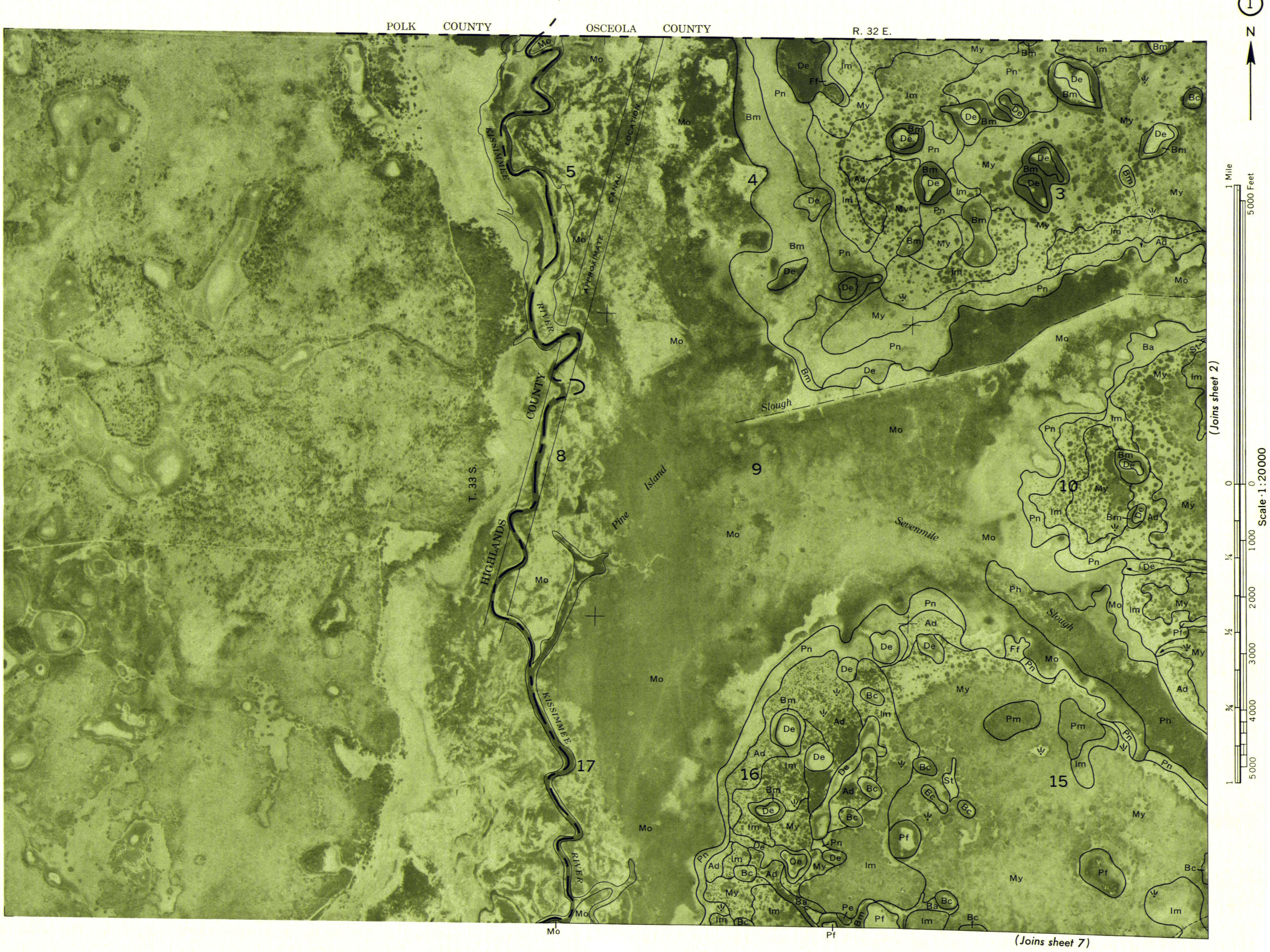
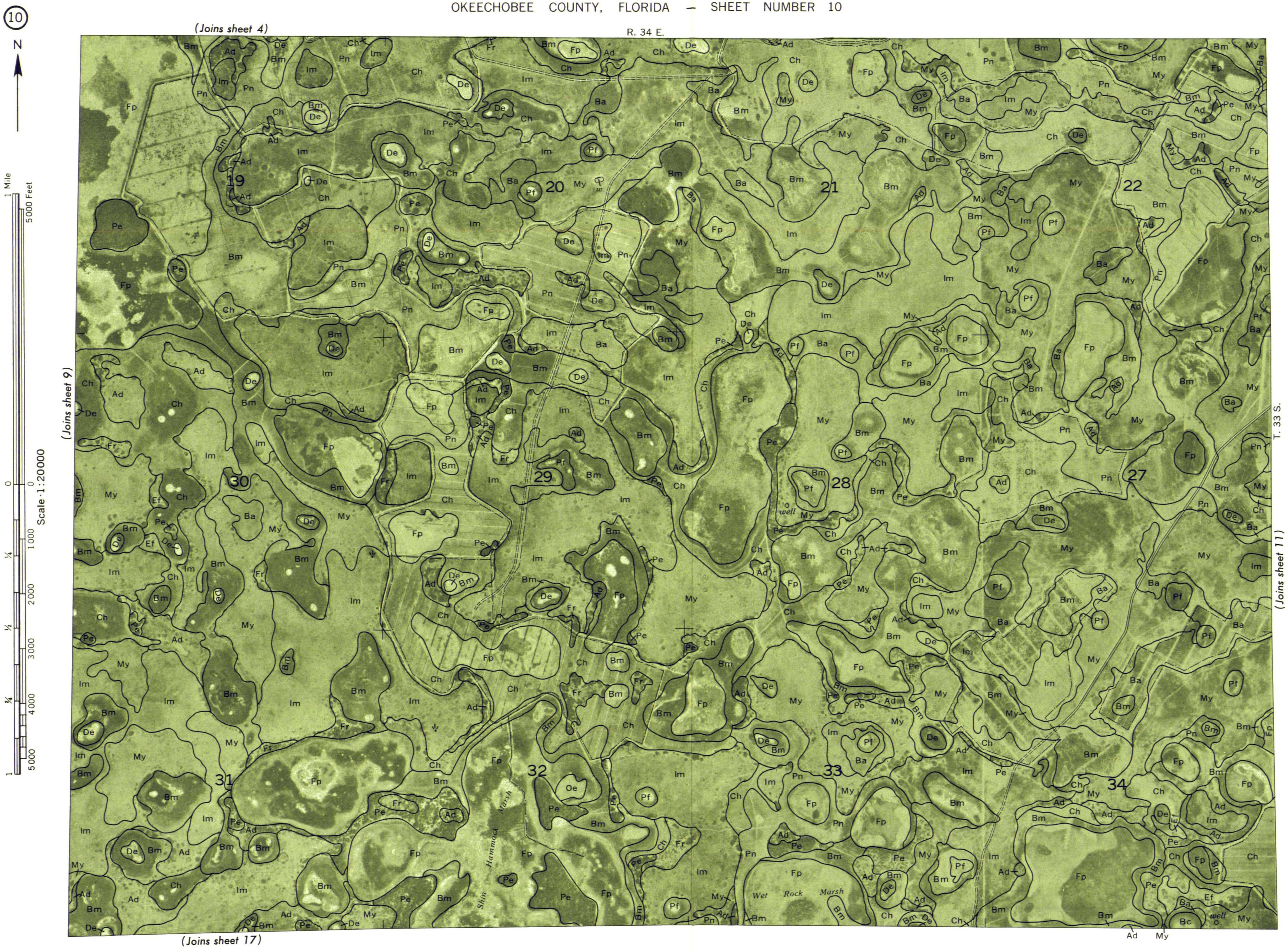


This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 1

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 10



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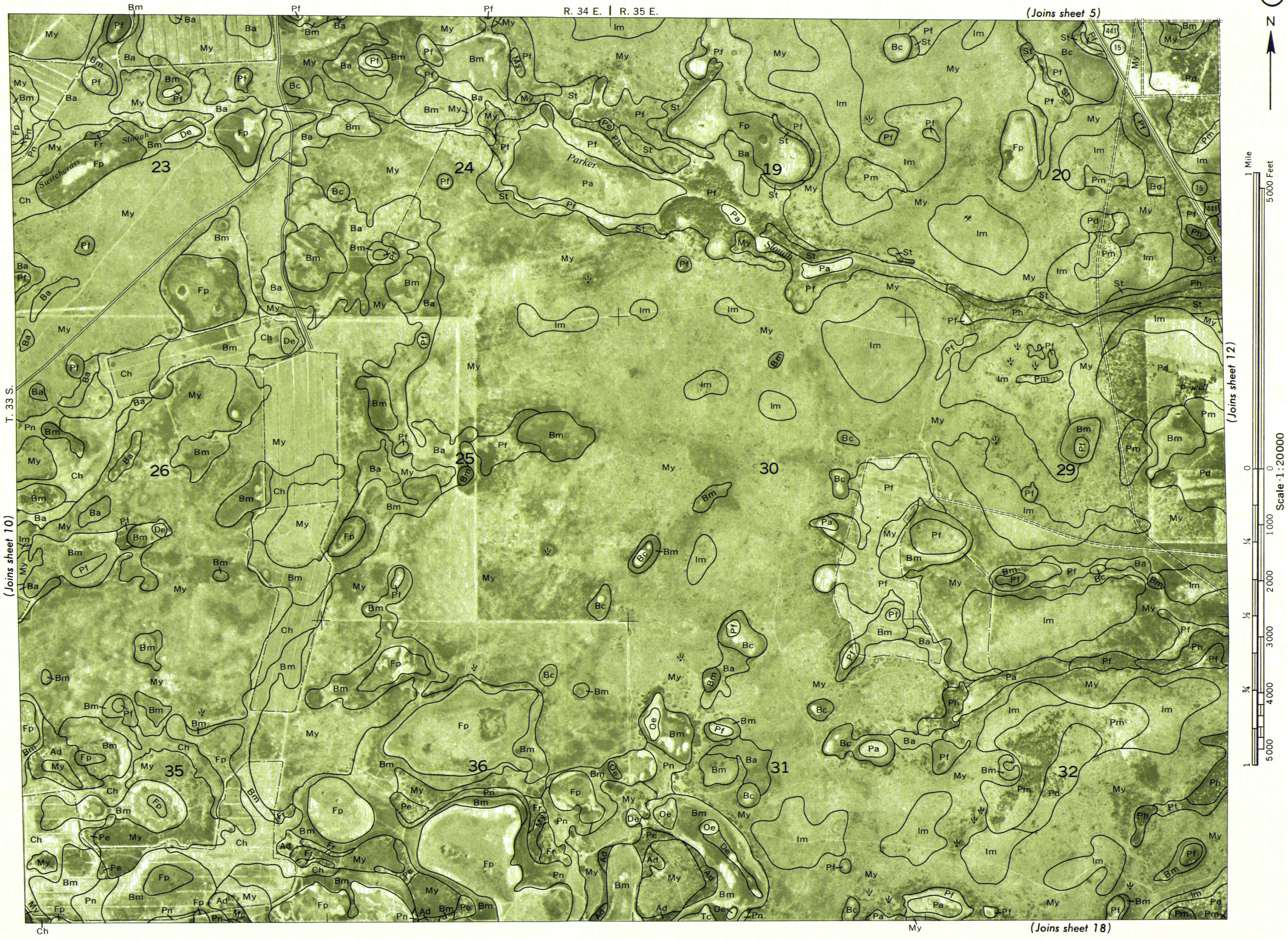

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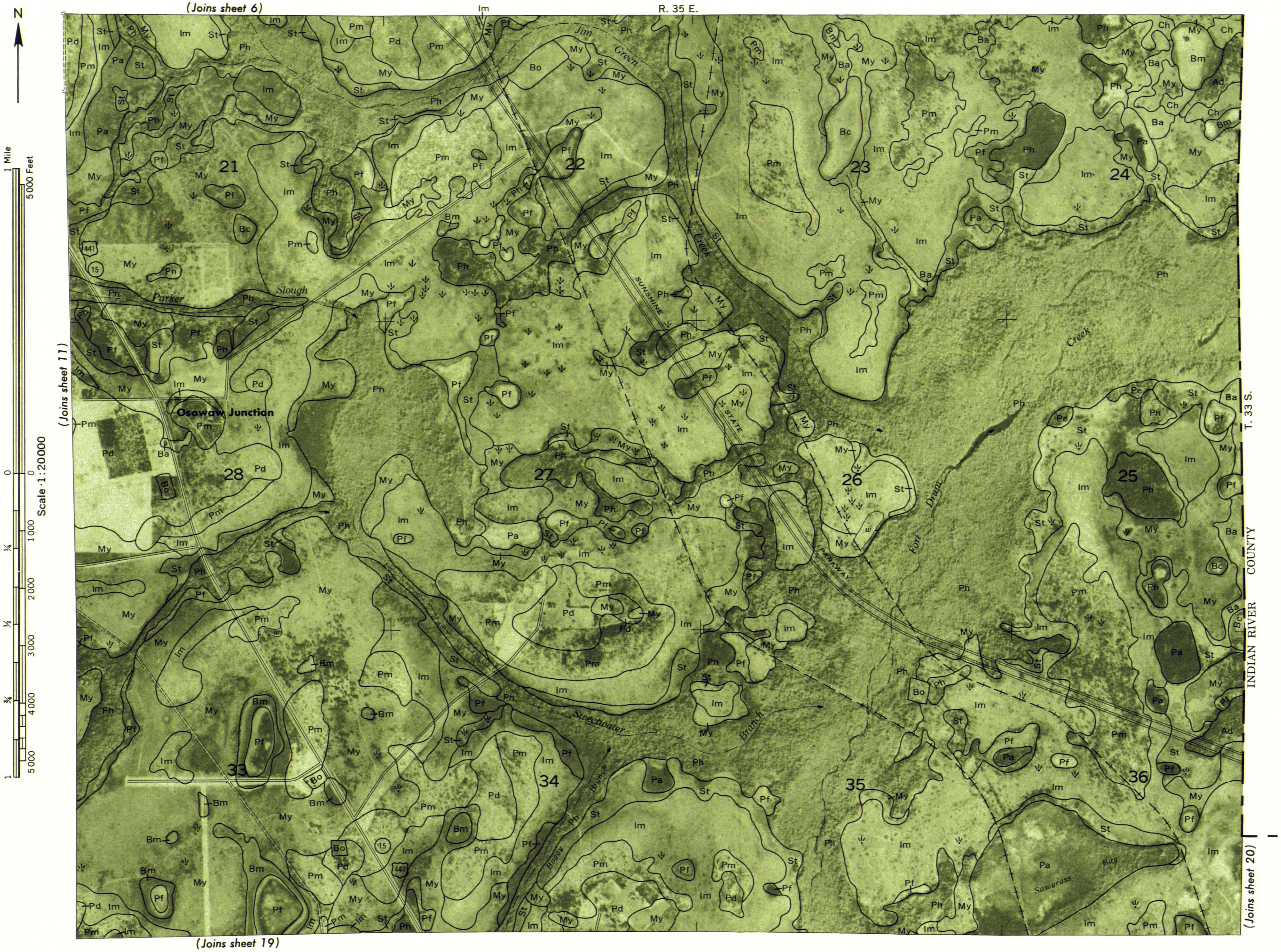

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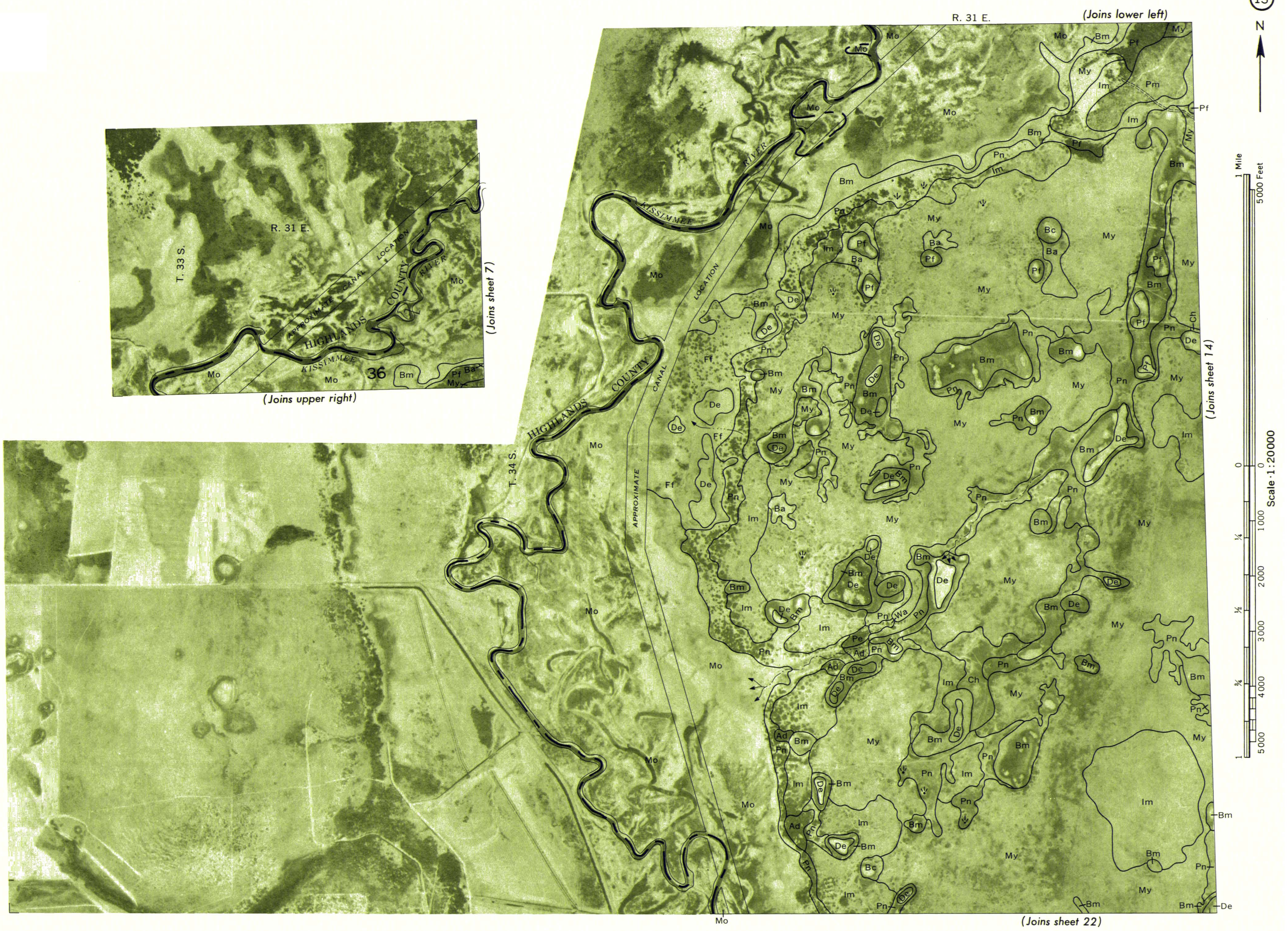

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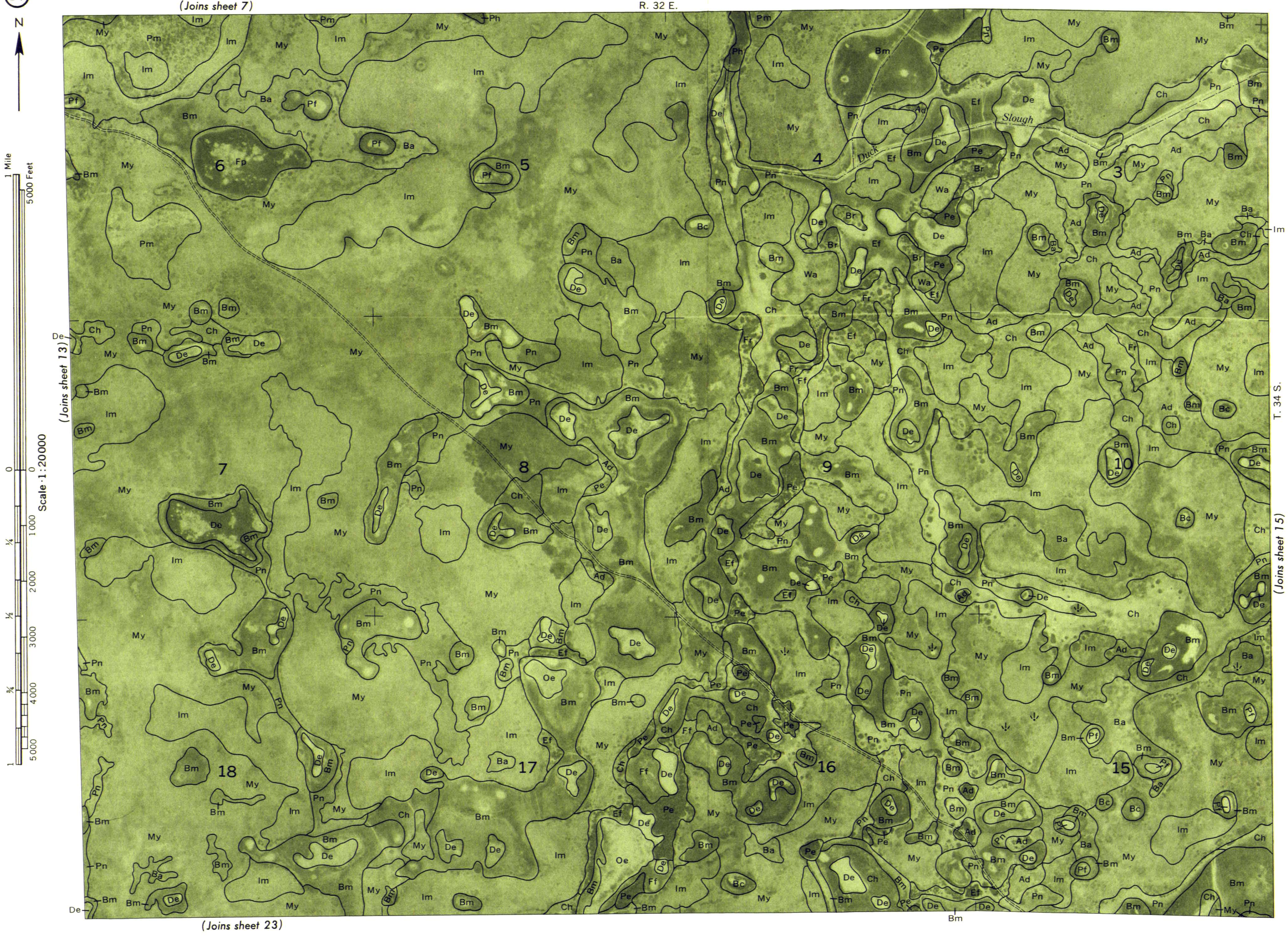

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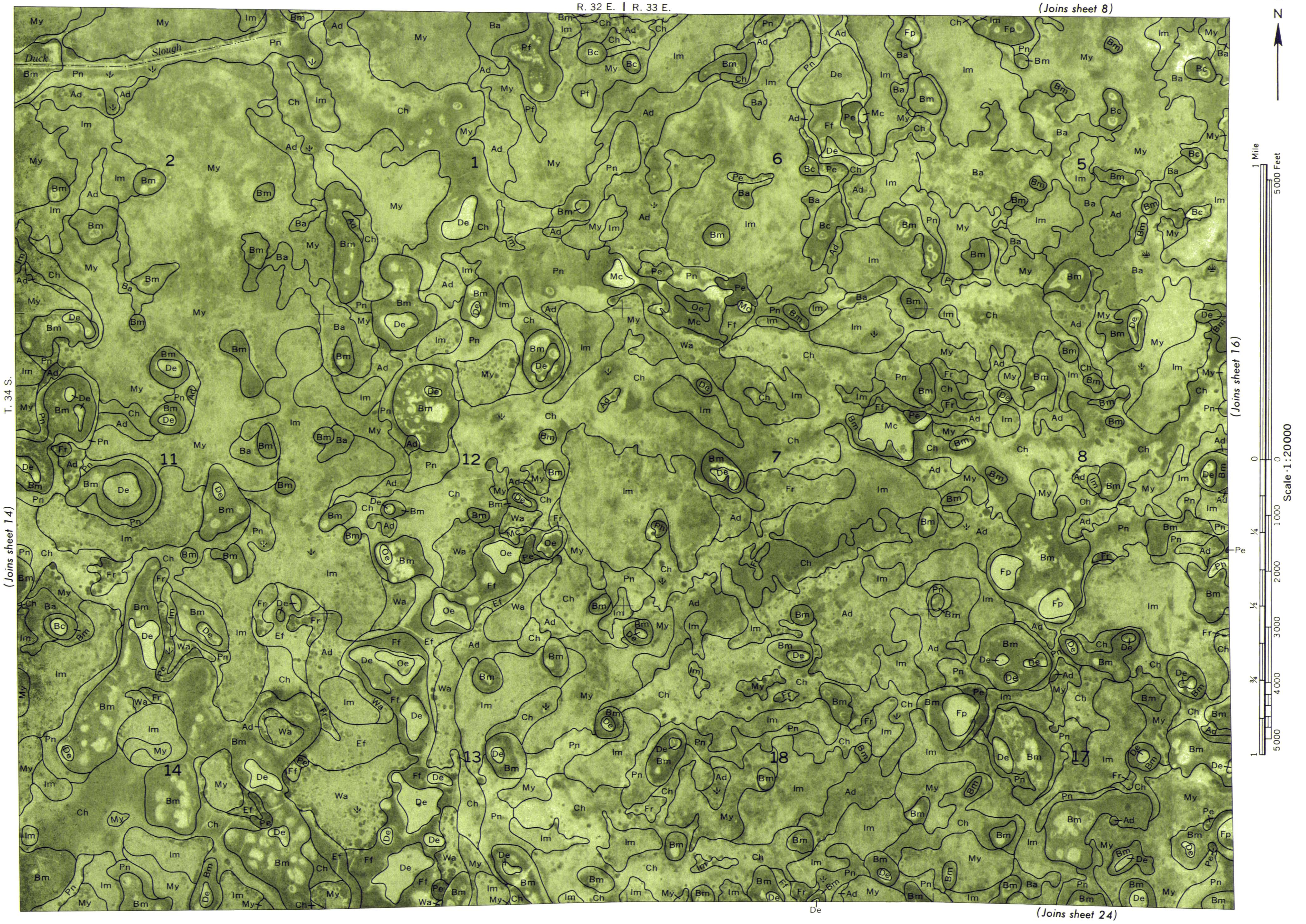

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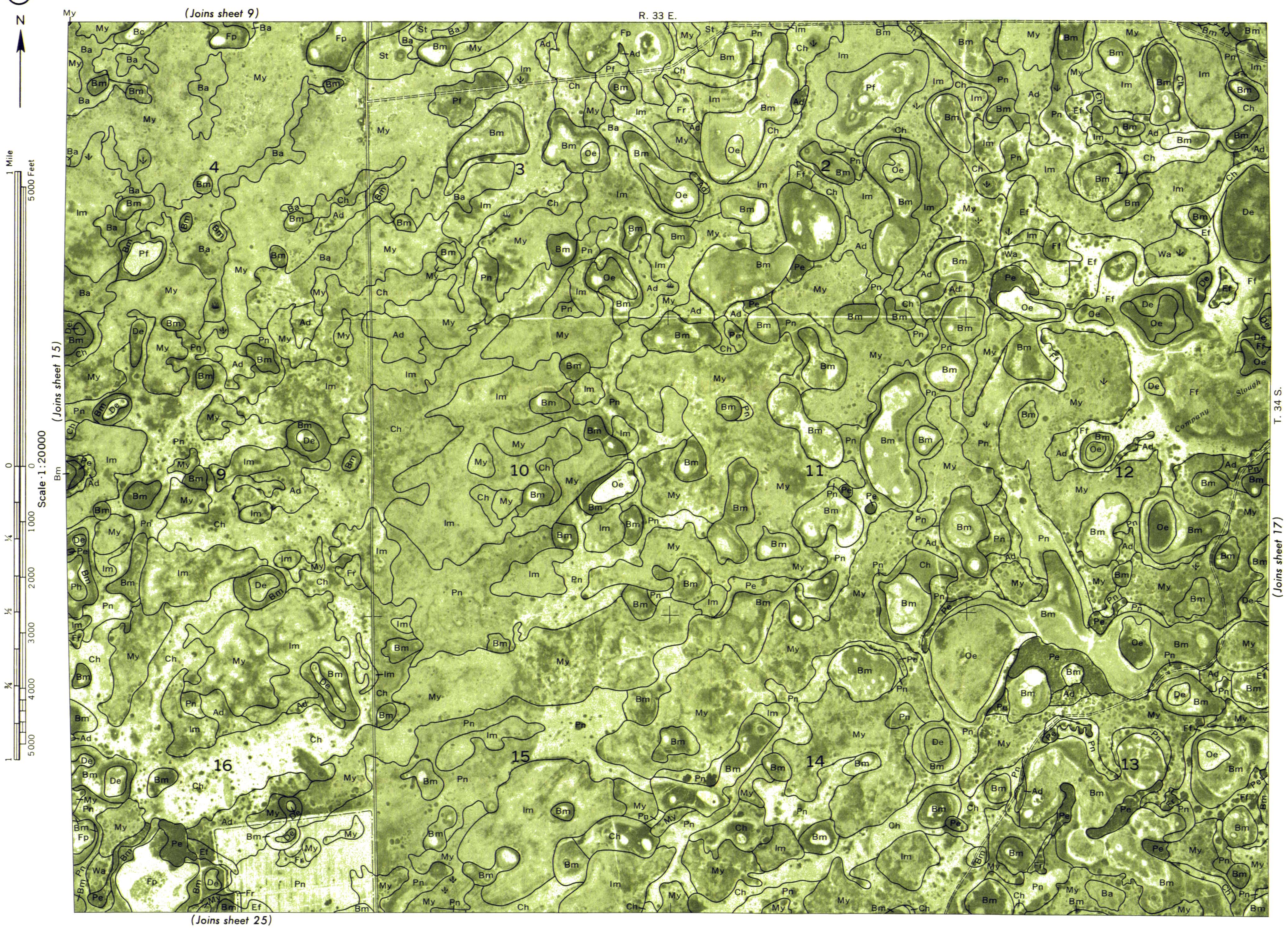

OKEECHOBEE COUNTY, FLORIDA NO. 16

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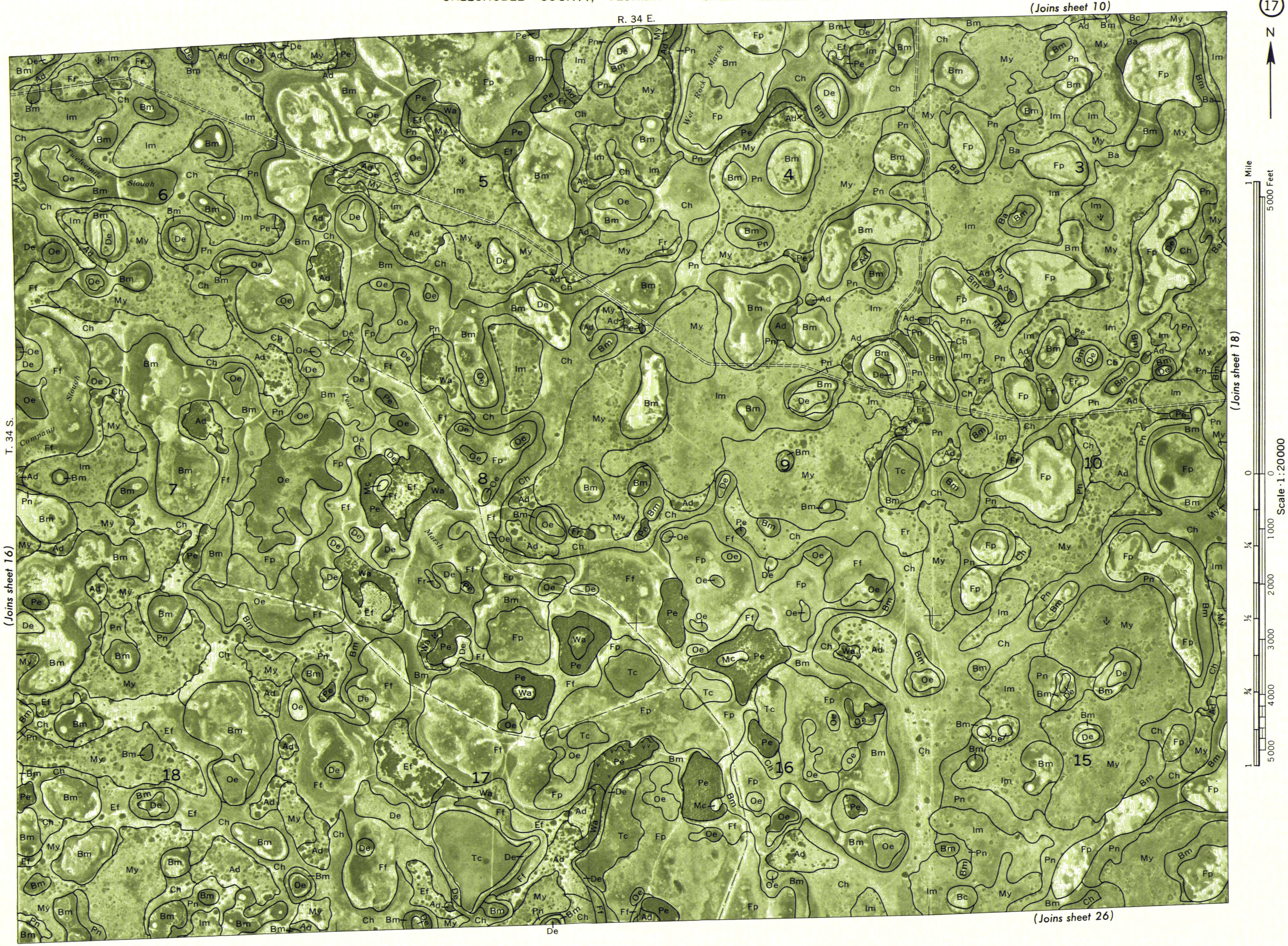

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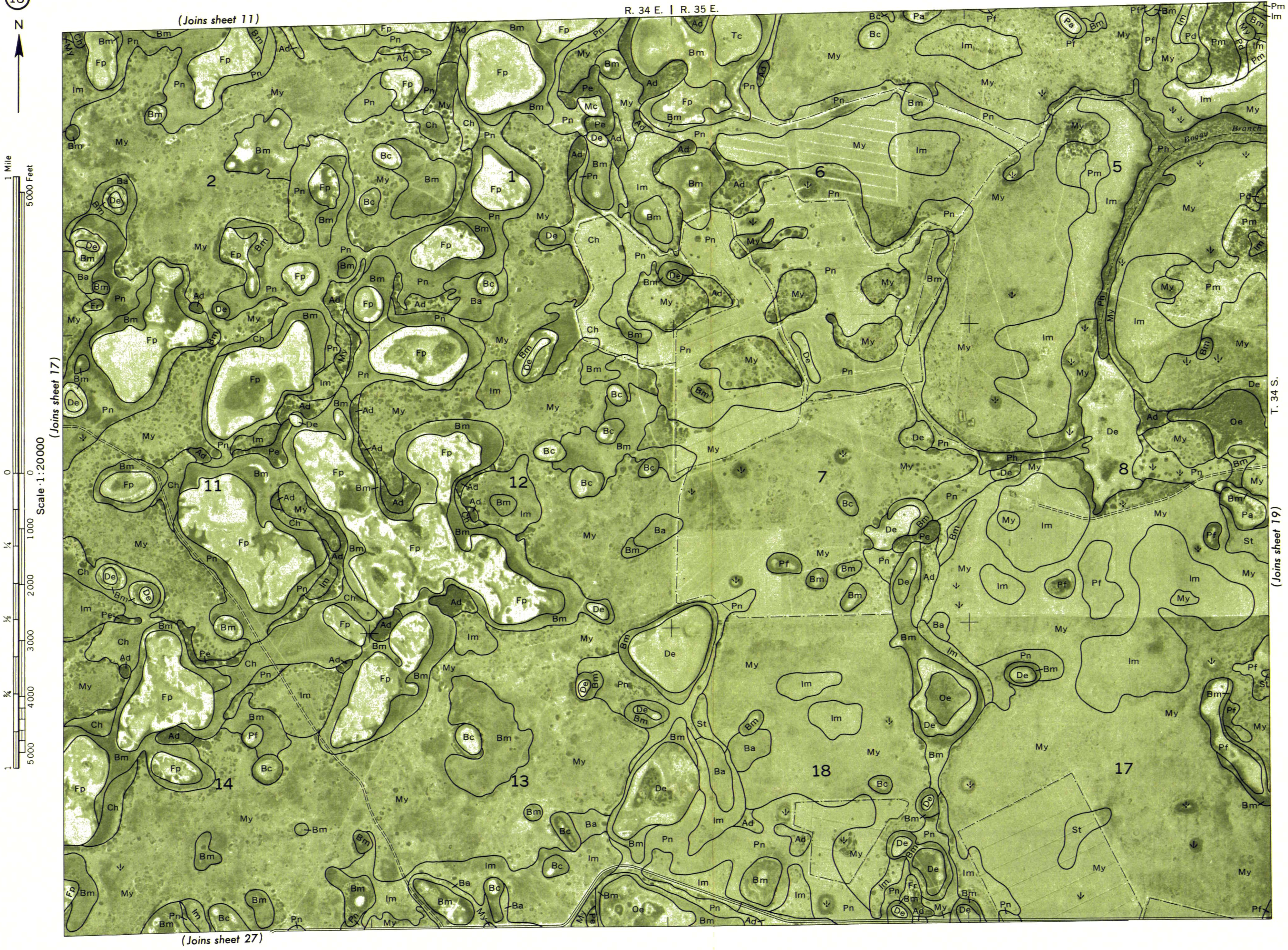
OKEECHOBEE COUNTY, FLORIDA NO. 17

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 18



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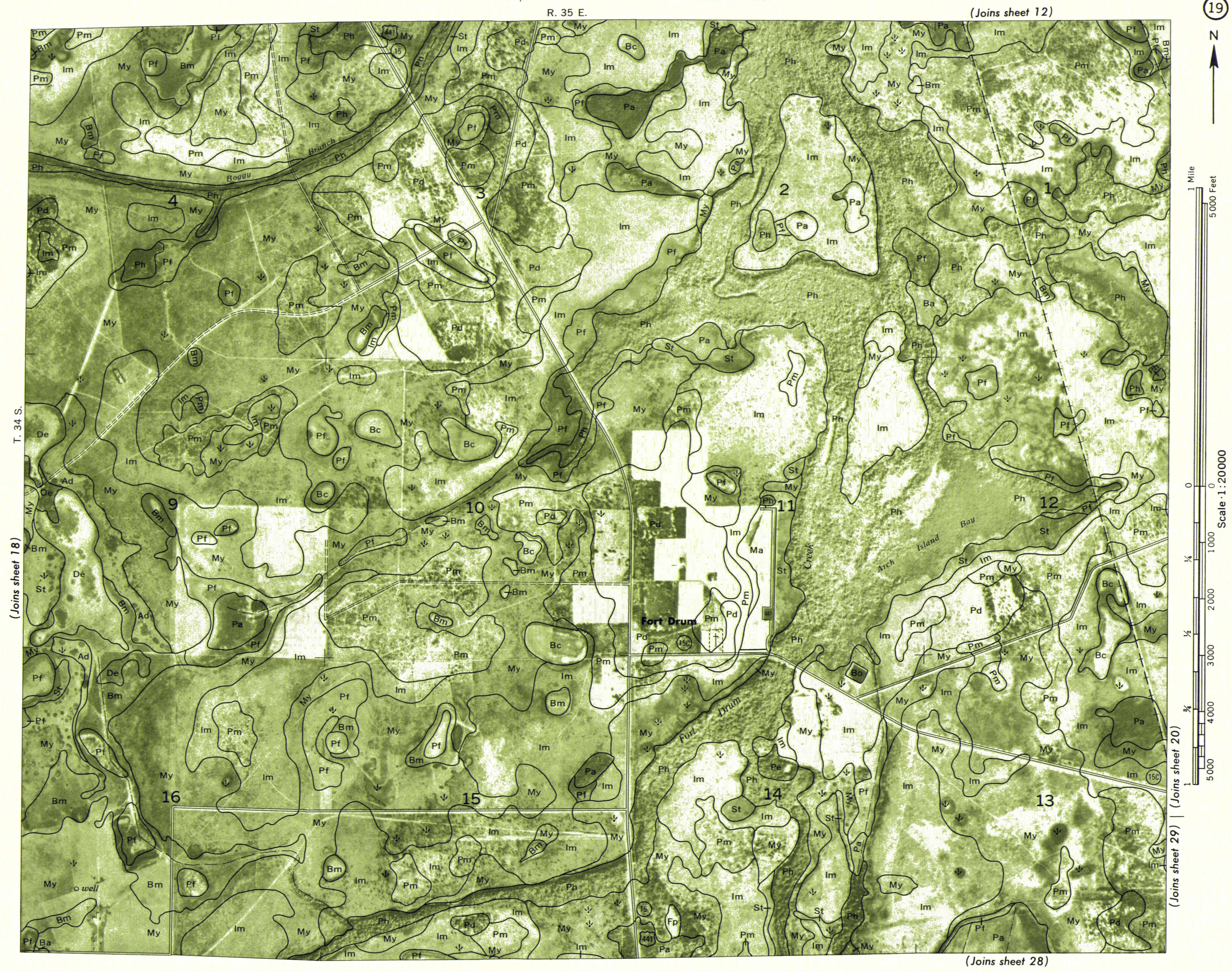

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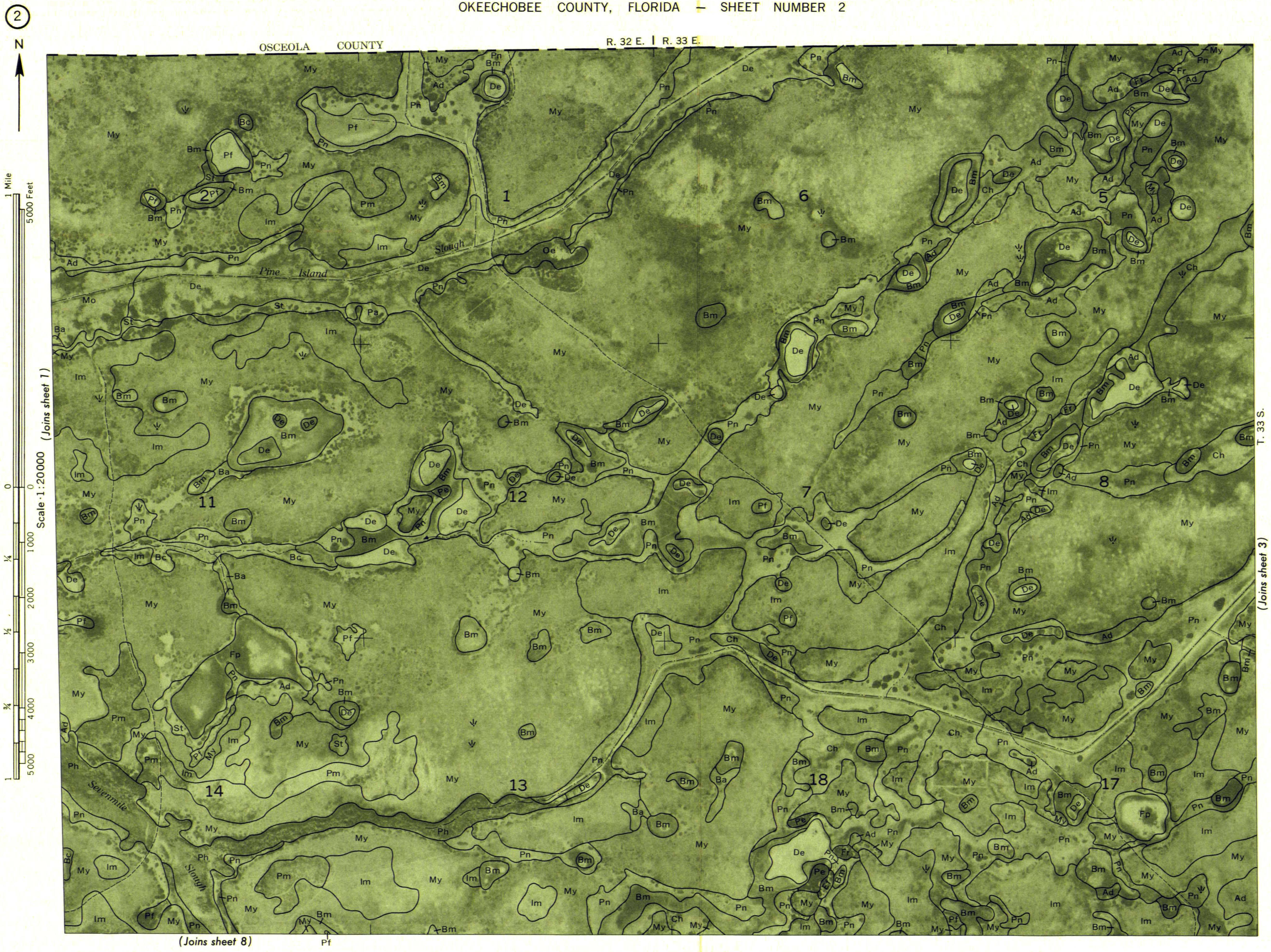
OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 2



OKEECHOBEE COUNTY, FLORIDA NO. 2

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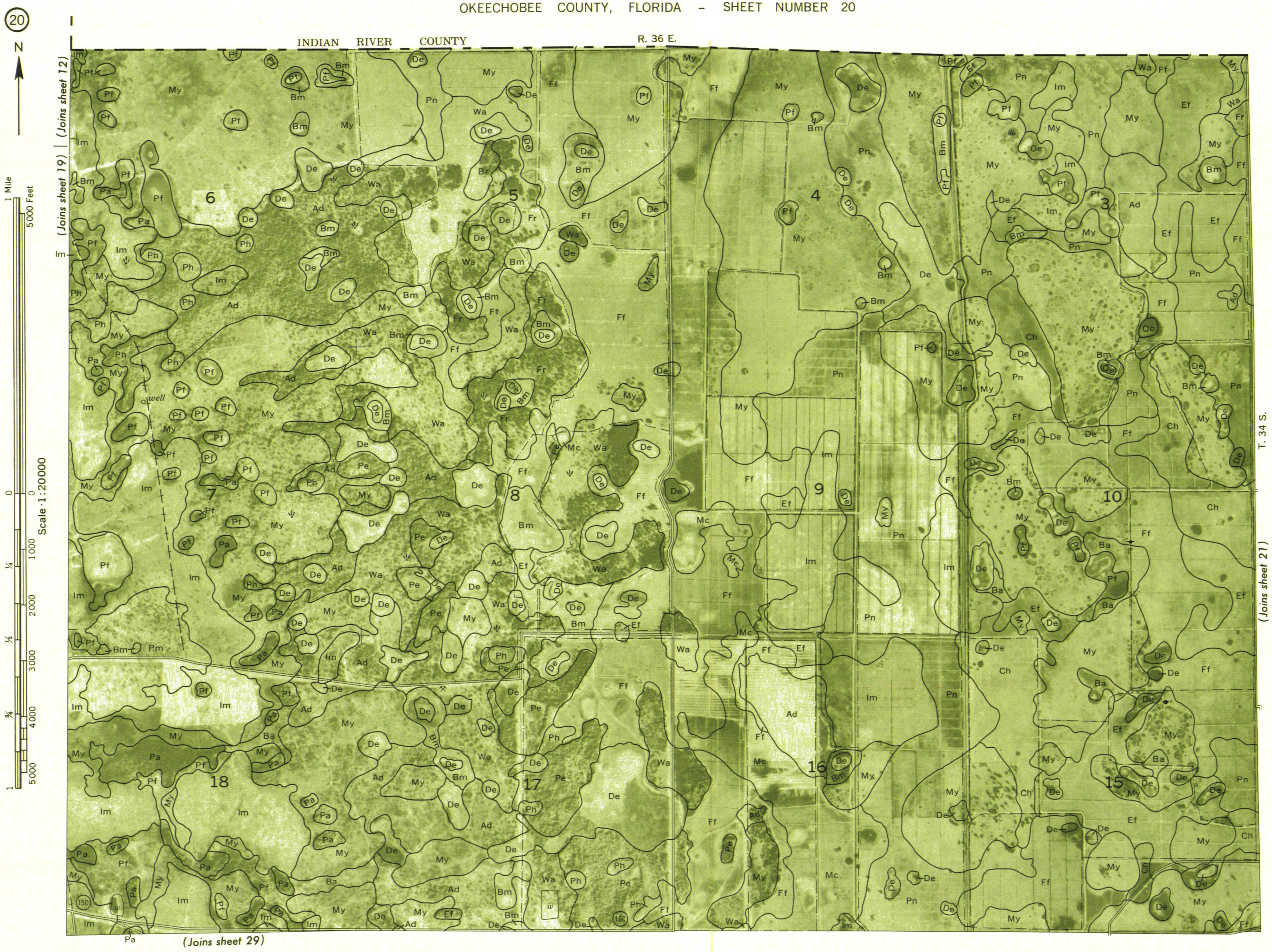

OKEECHOBEE COUNTY, FLORIDA NO. 20

Land division corners are approximately positioned on this map.

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Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 22

N

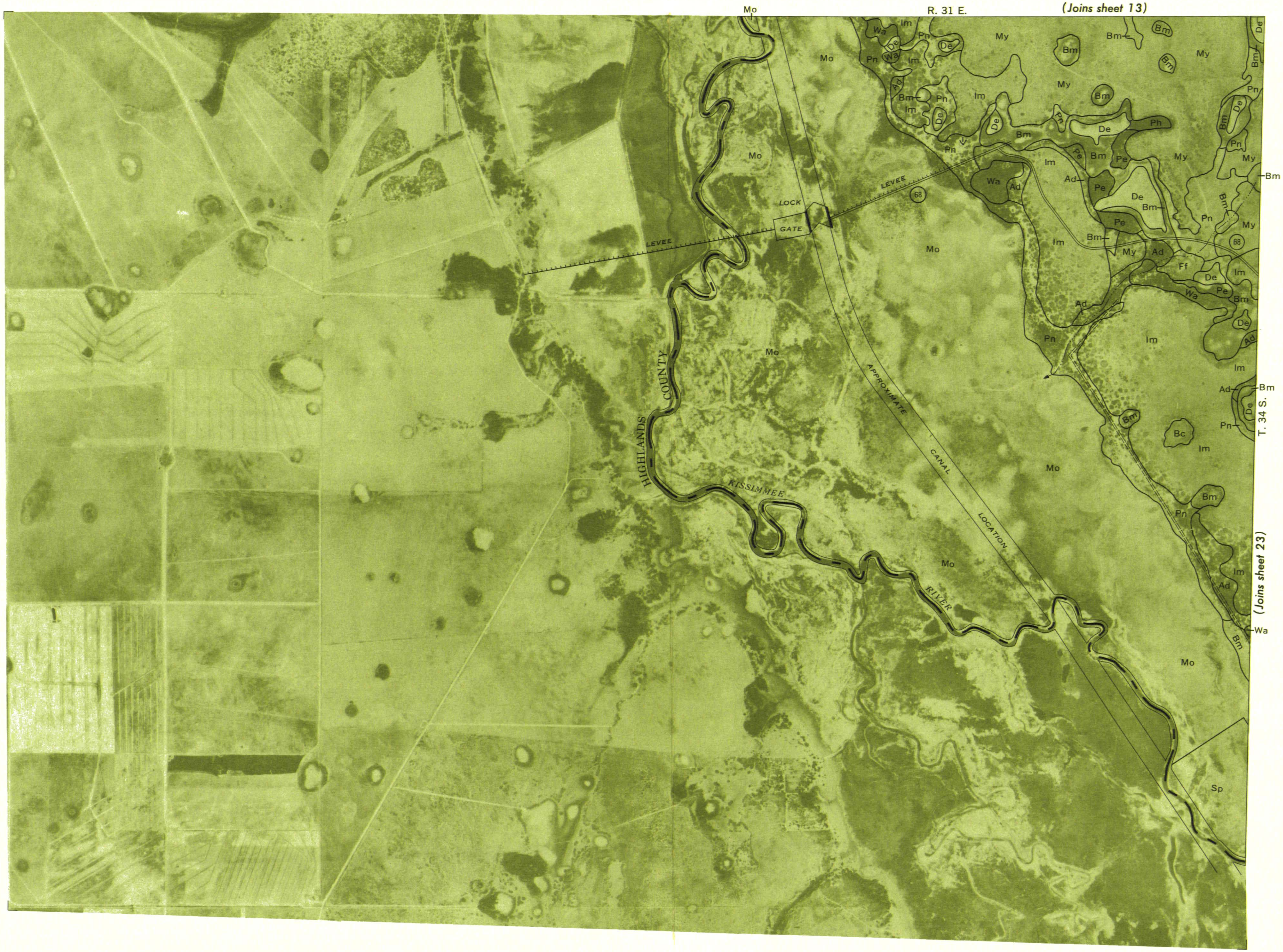
1 Mile

5000 Feet

Scale 1:20000

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000



OKEECHOBEE COUNTY, FLORIDA NO. 22

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

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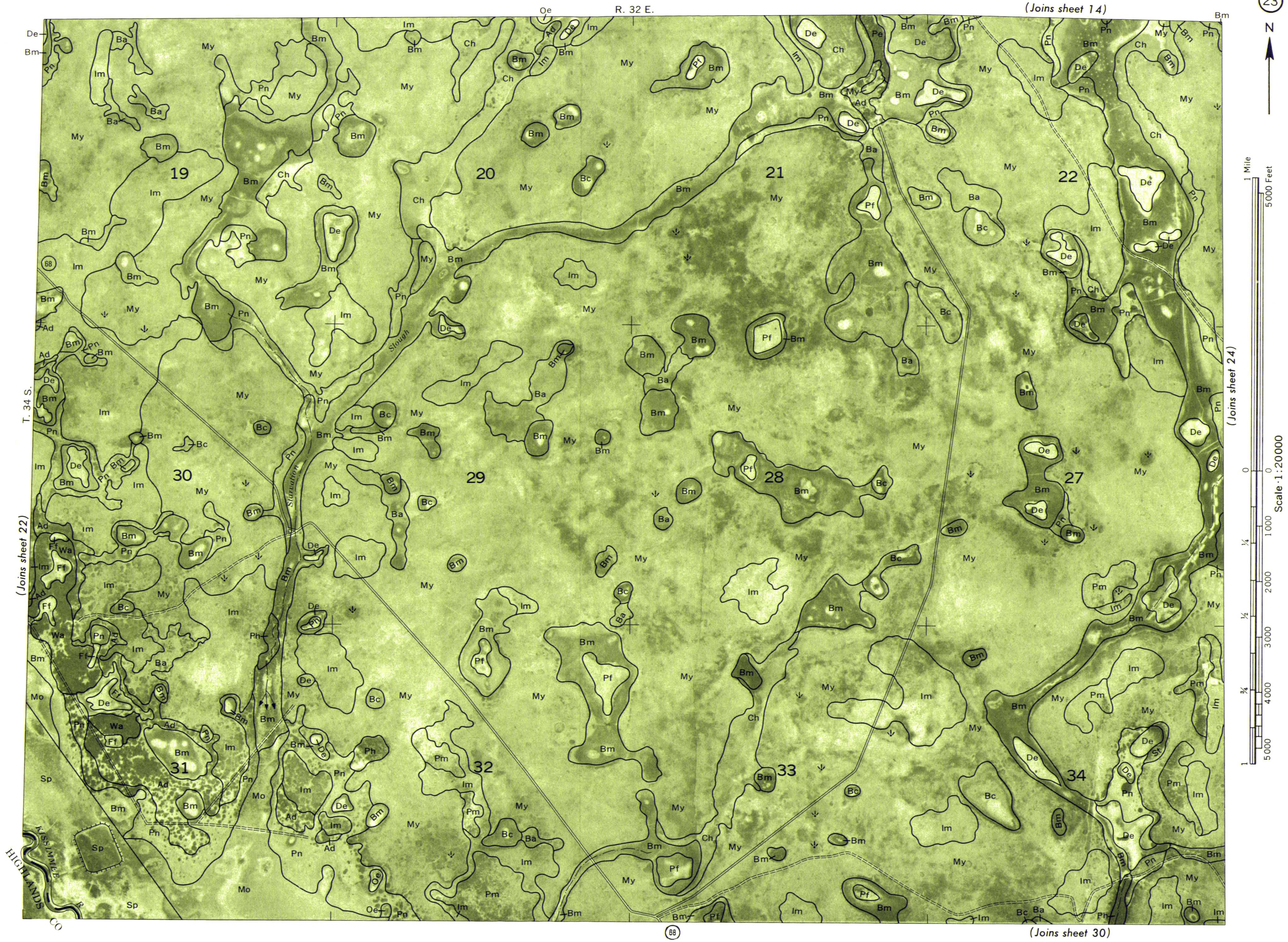
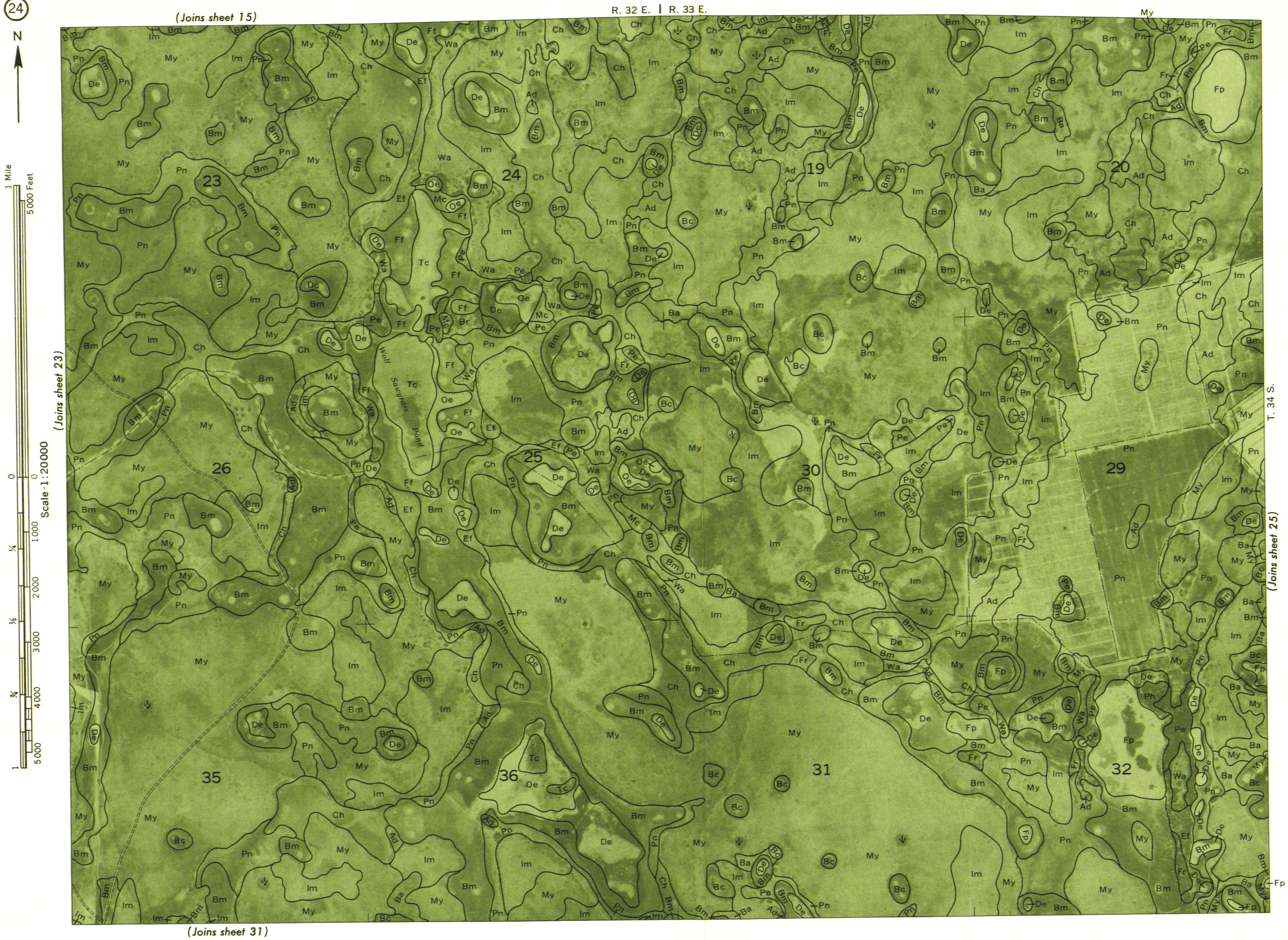
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 23



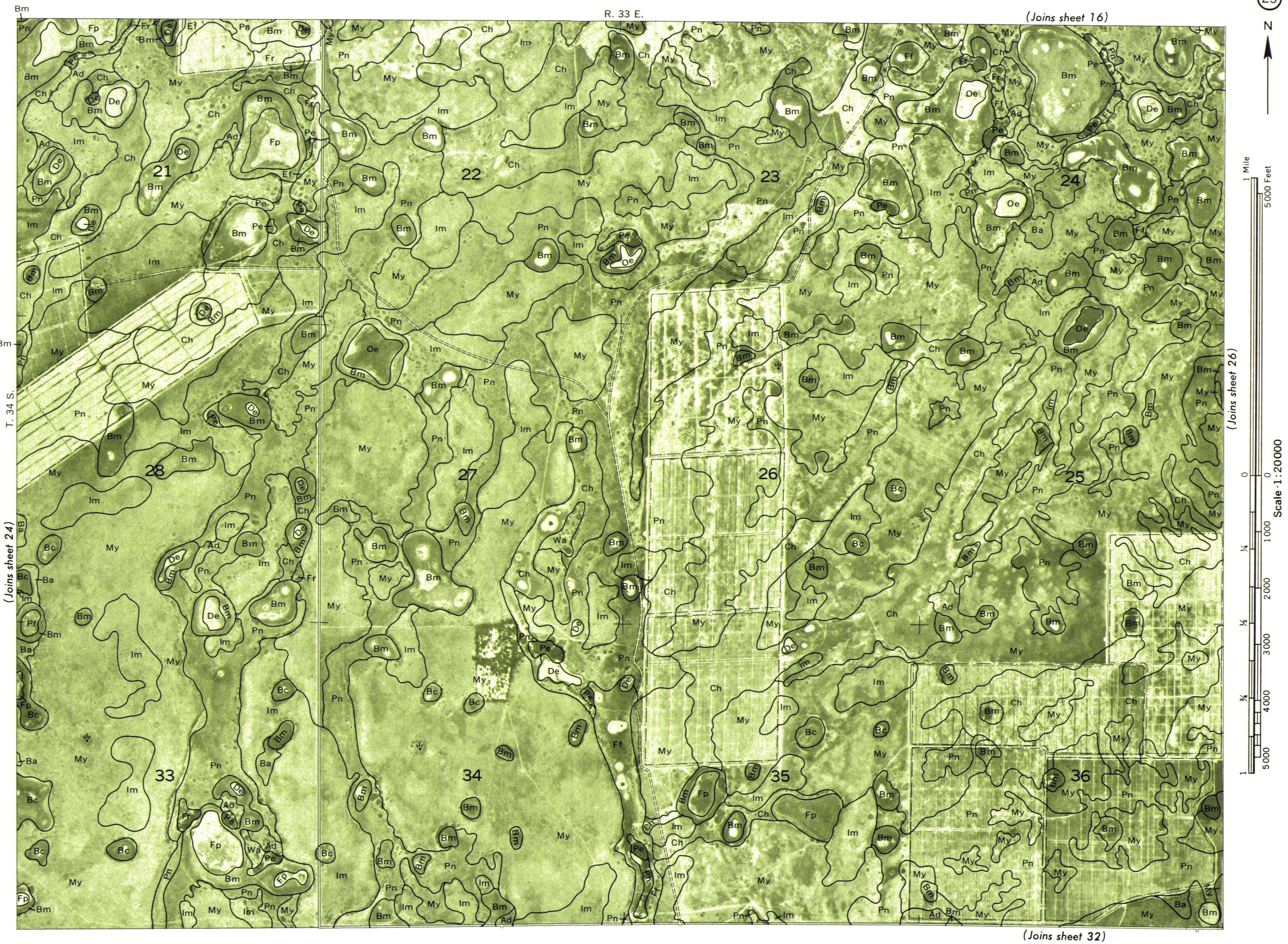
OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 24



OKEECHOBEE COUNTY, FLORIDA NO. 24

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

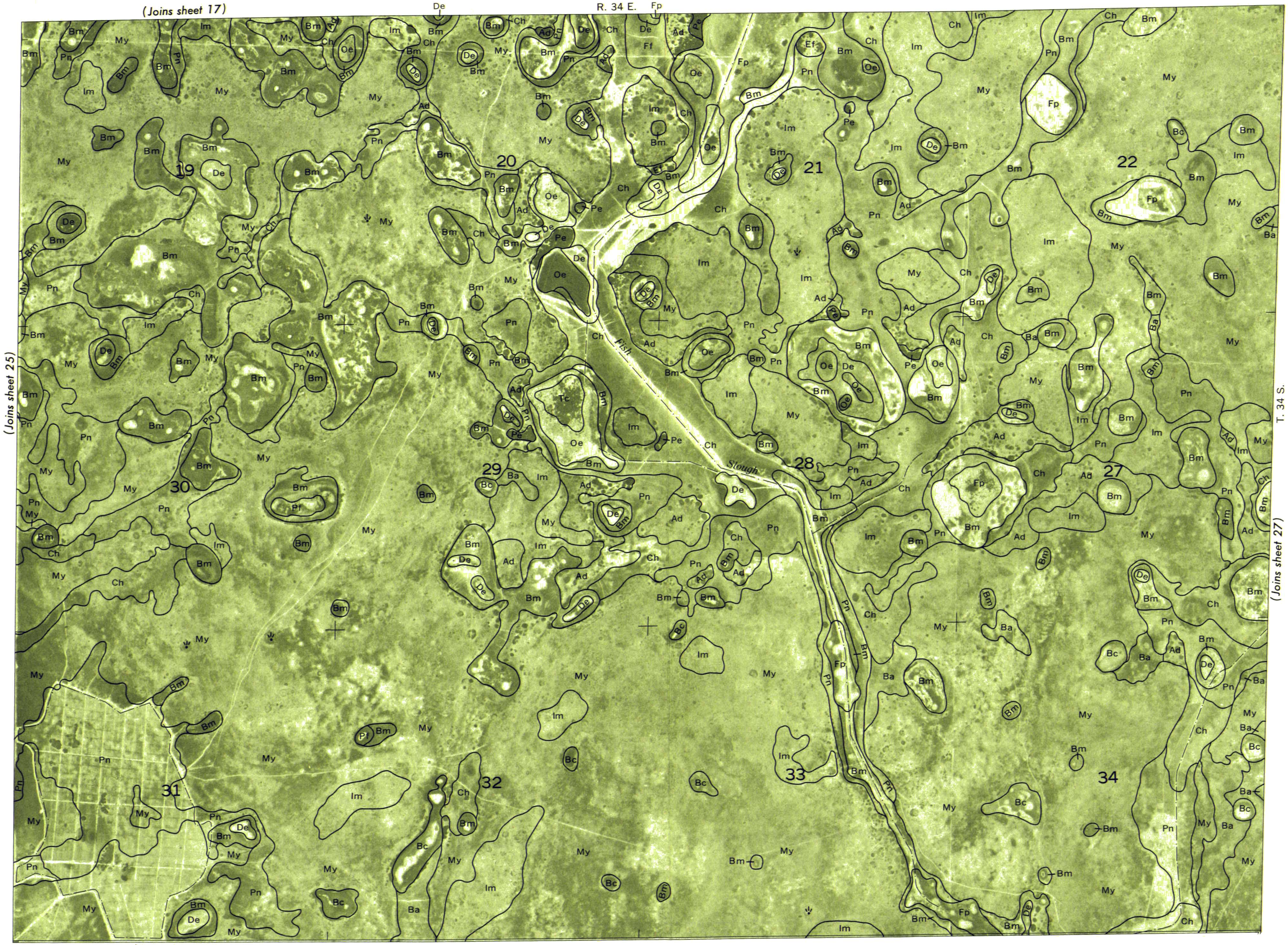


OKEECHOBEE COUNTY, FLORIDA NO. 25

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 196[illegible] as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 26



N

Scale 1:20000

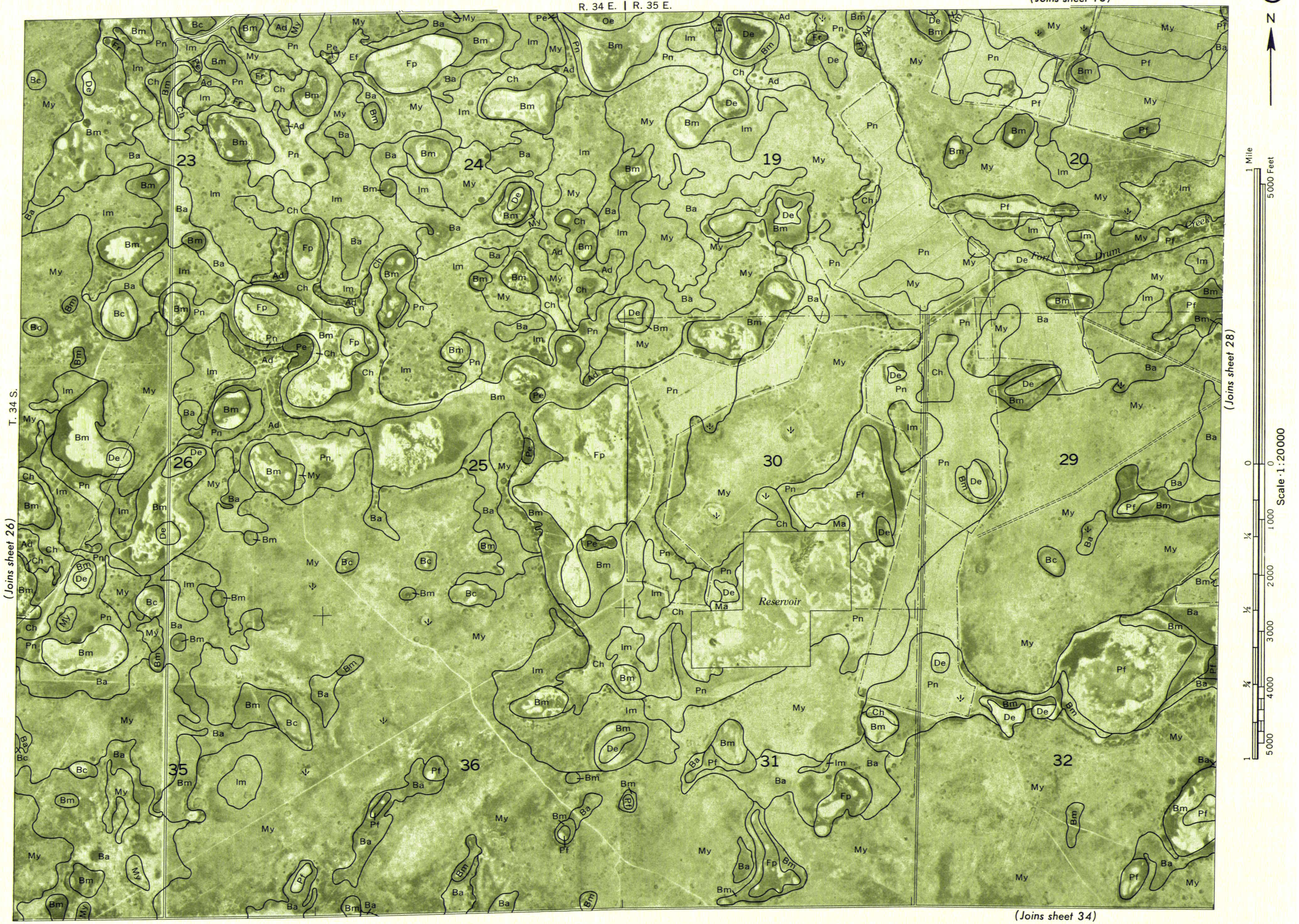
1 Mile ¾ ½ ¼ 0

5000 Feet 4000 3000 2000 1000 0 5000

OKEECHOBEE COUNTY, FLORIDA NO. 26

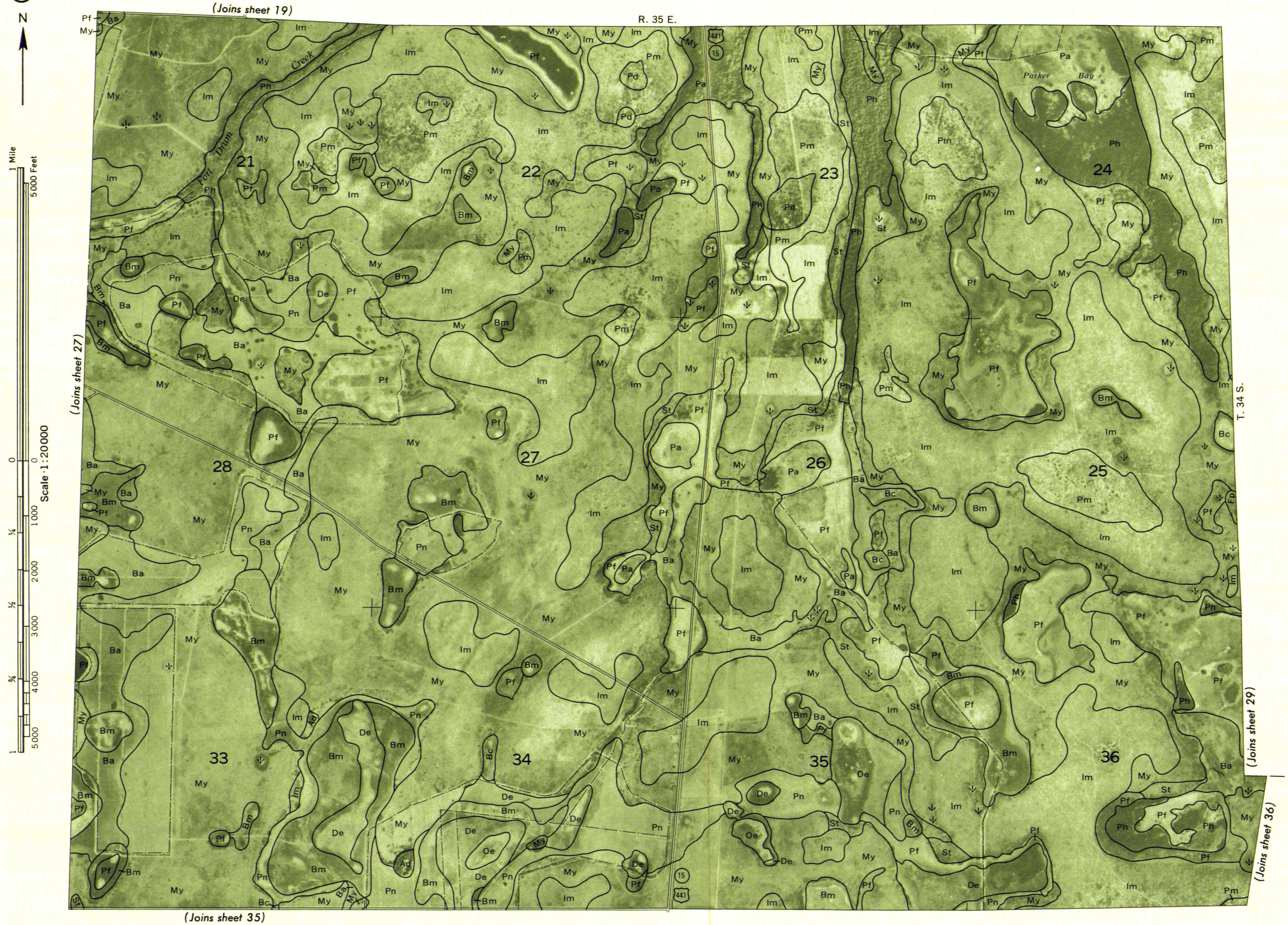
Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 28



OKEECHOBEE COUNTY, FLORIDA NO. 28

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

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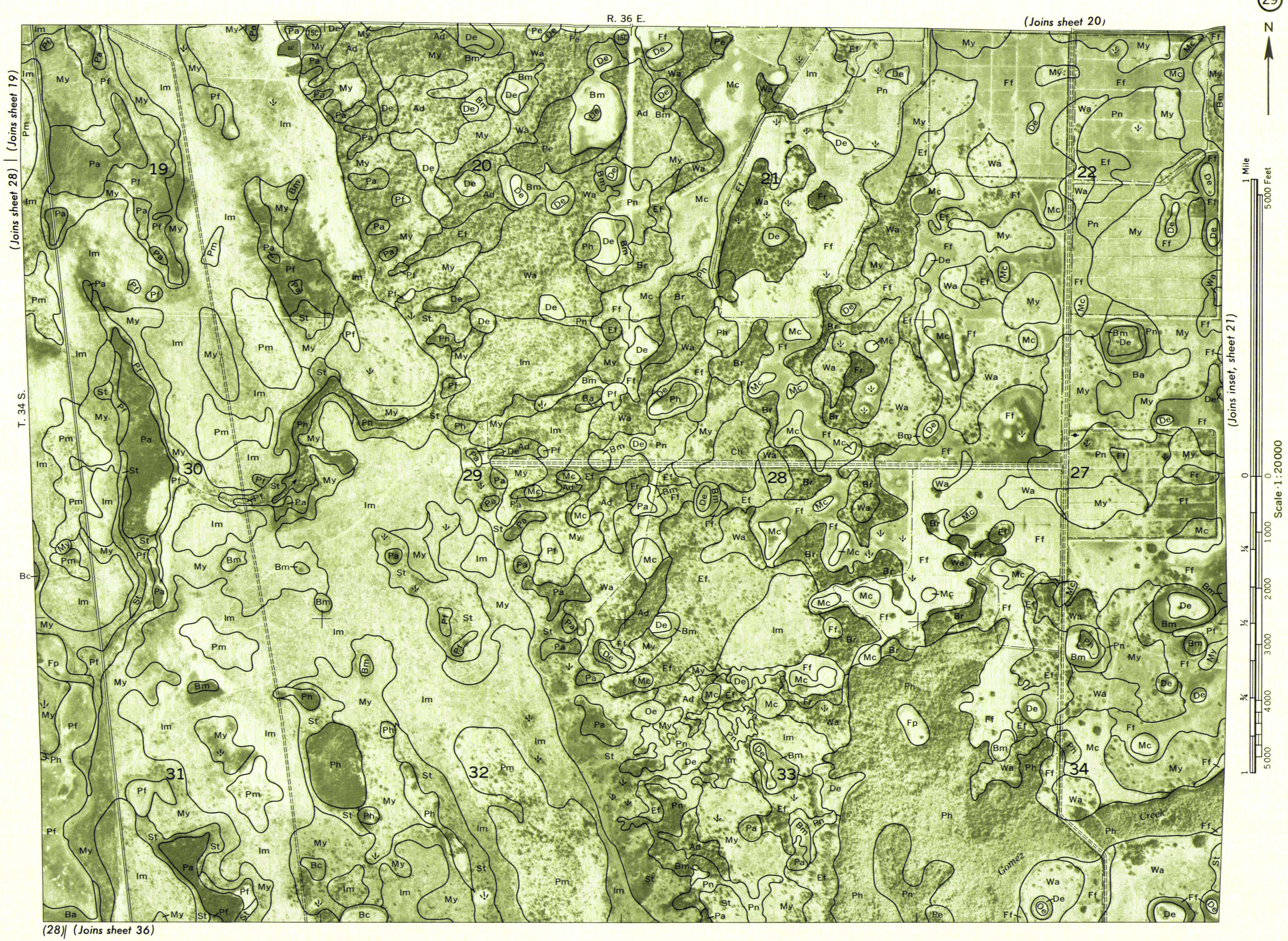
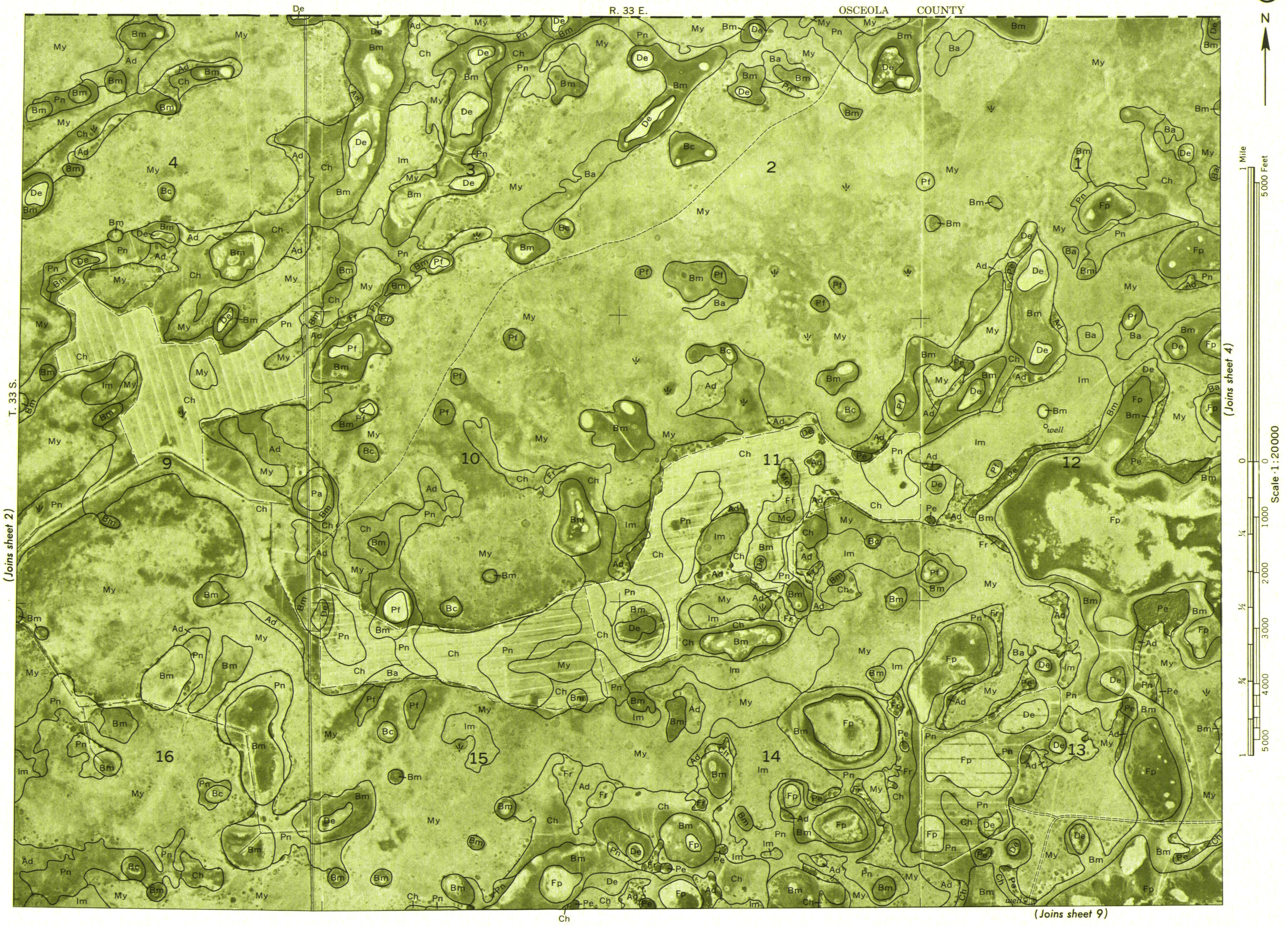
Land division corners are approximately positioned on this map.

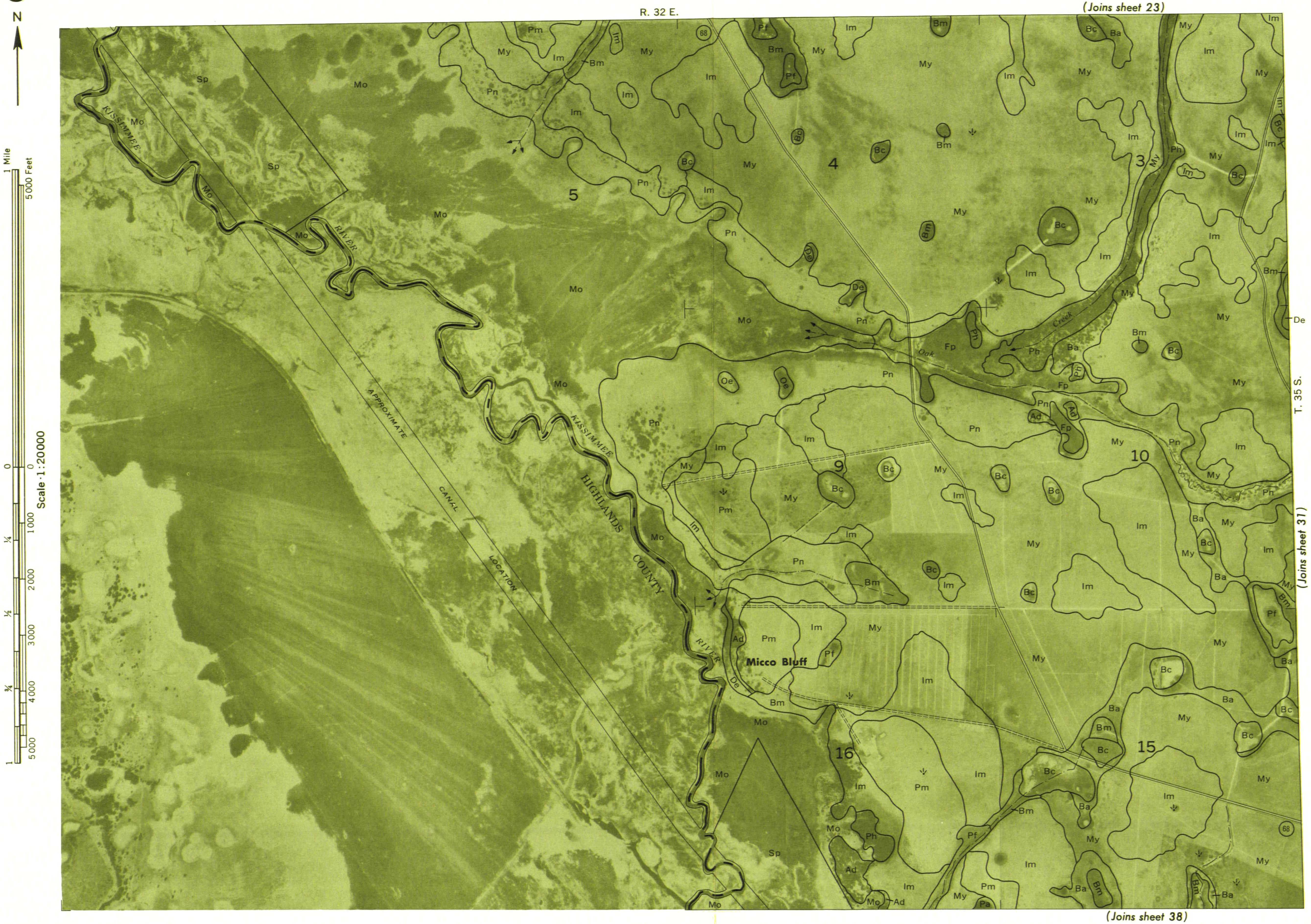




This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 3

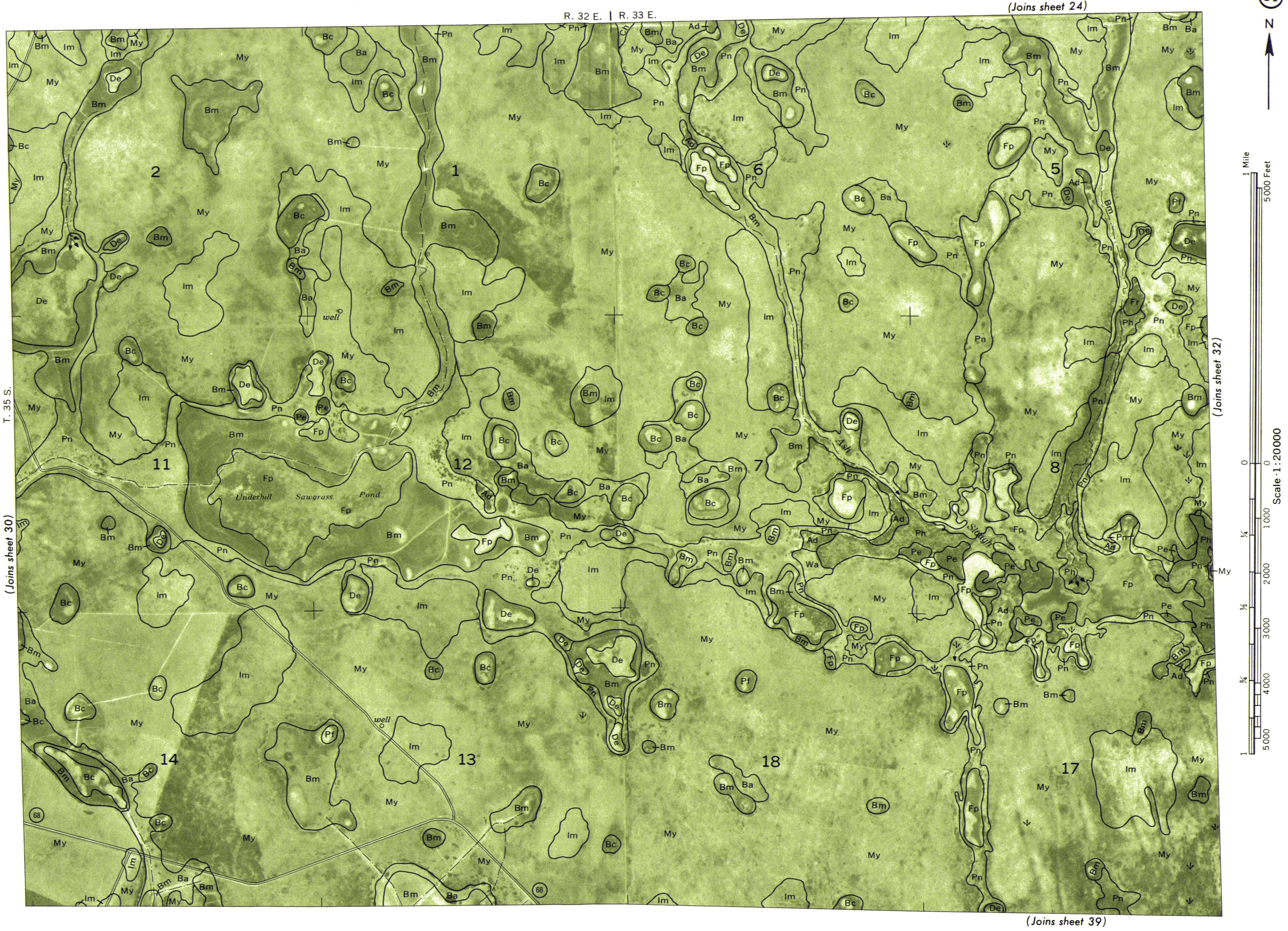
OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 30



OKEECHOBEE COUNTY, FLORIDA NO. 30

Land division corners are approximately positioned on this map.

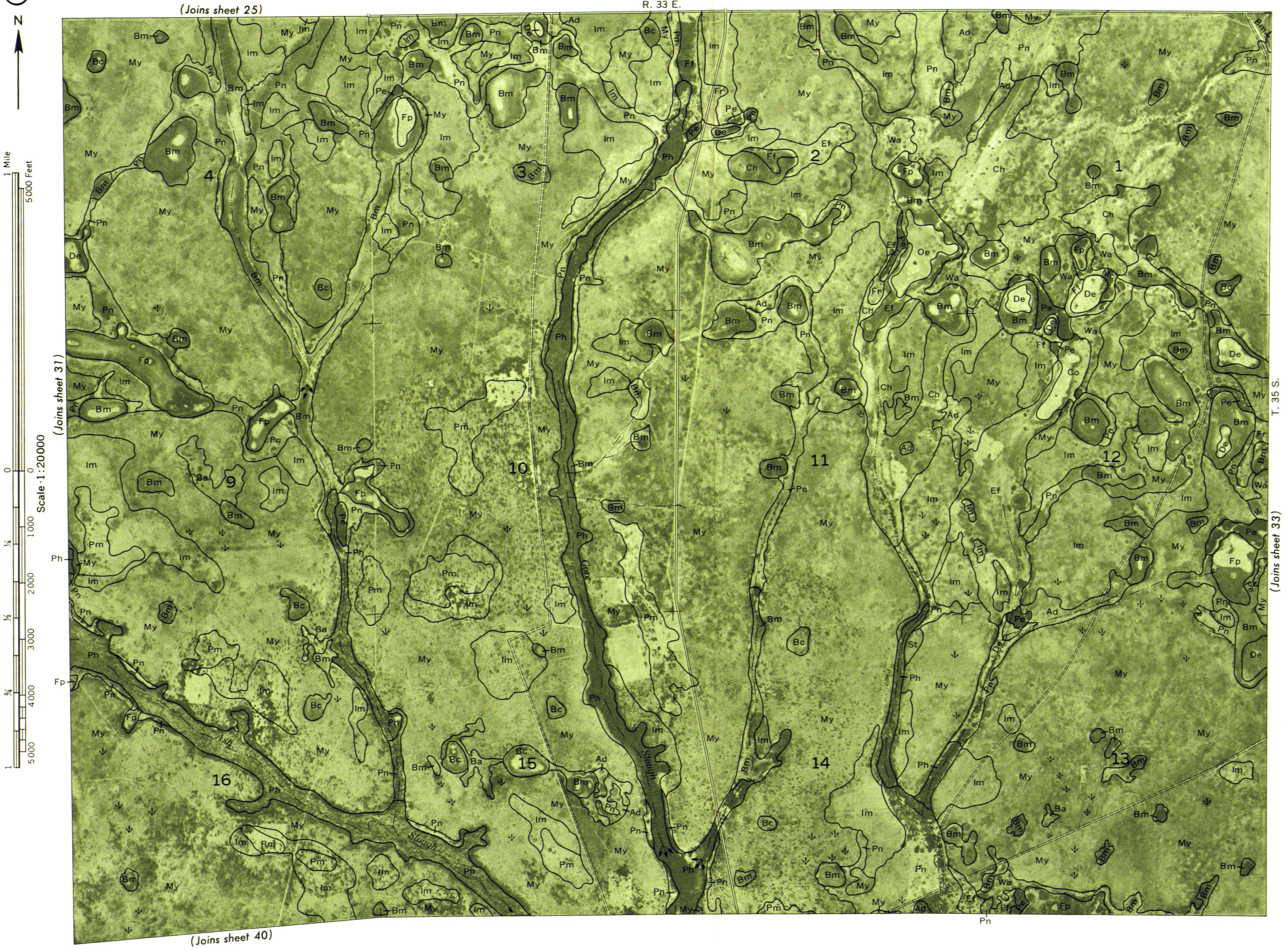
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



OKEECHOBEE COUNTY, FLORIDA NO. 31

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

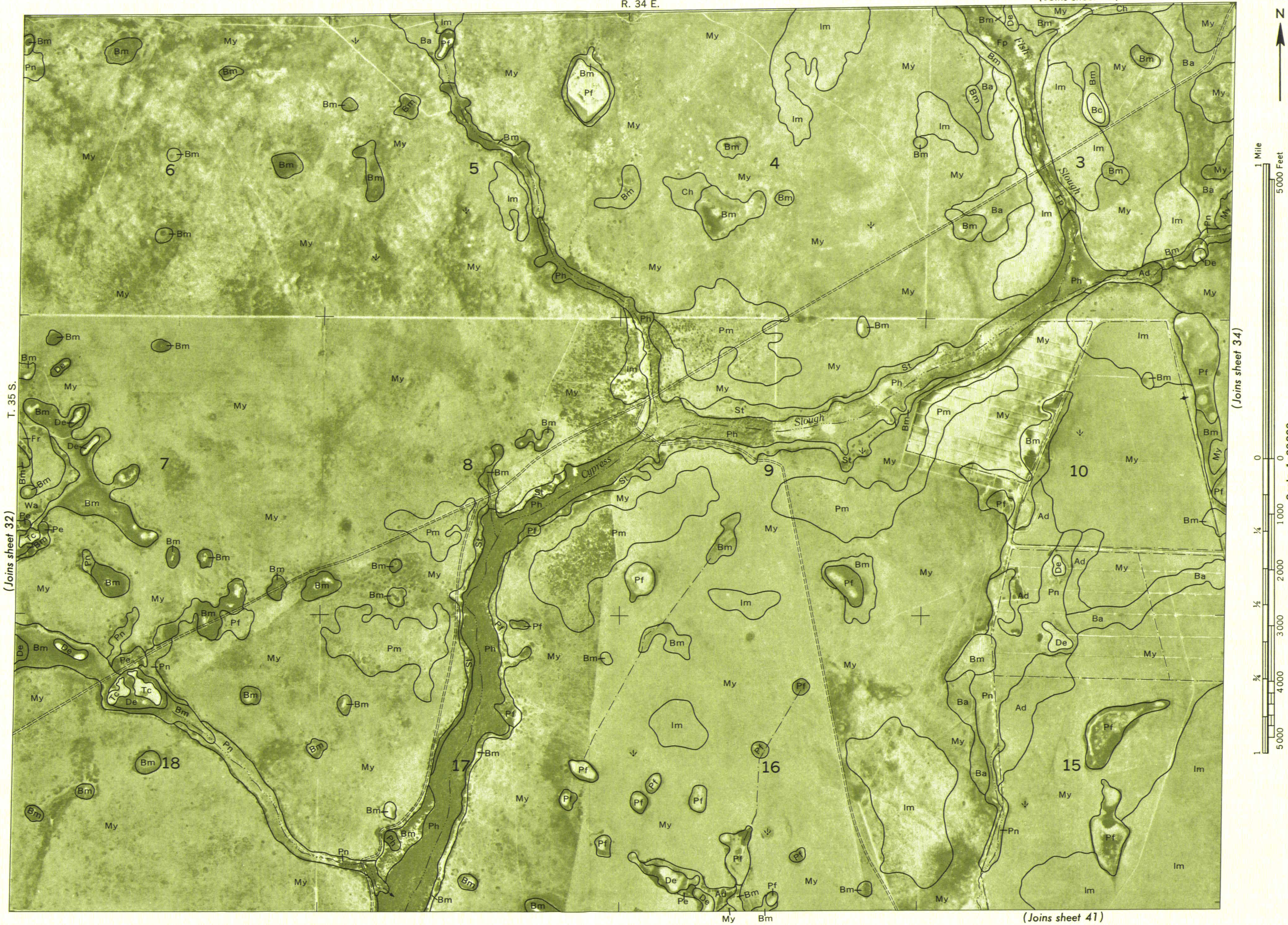
OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 32



OKEECHOBEE COUNTY, FLORIDA NO. 32

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



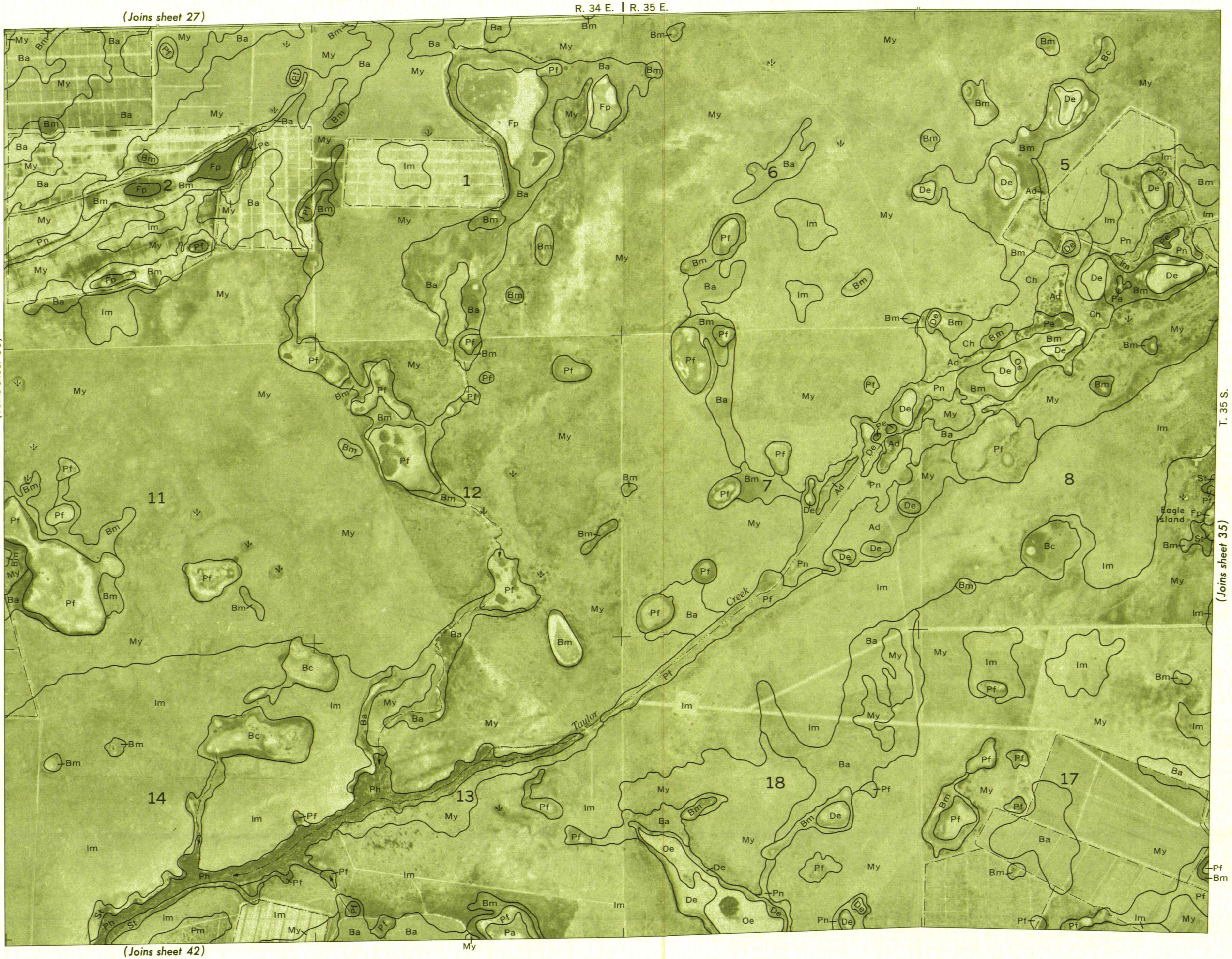
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

34

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 34

N

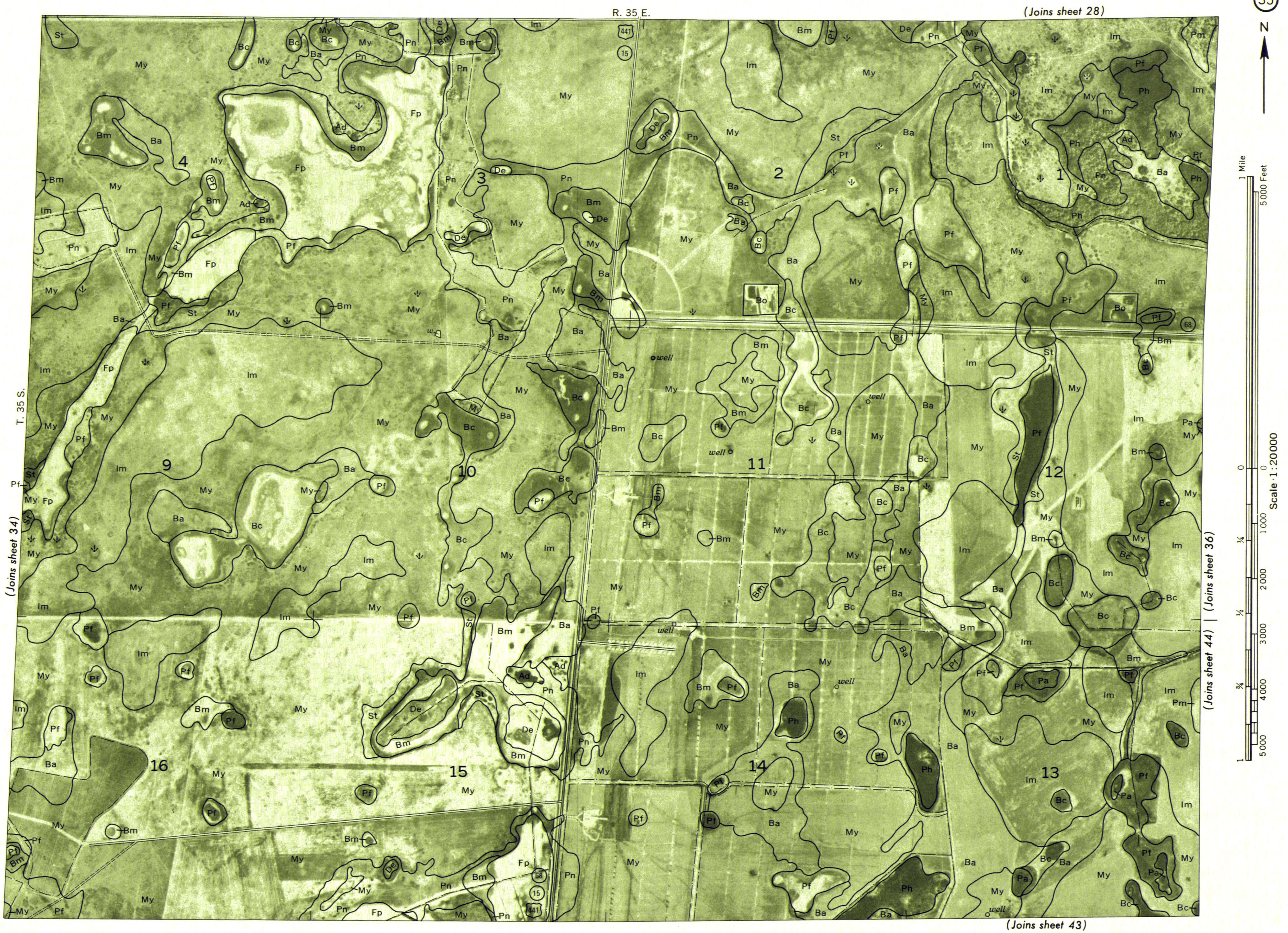
1 Mile
5000 Feet
Scale 1:20000
0 1000 2000 3000 4000 5000
0 ¼ ½ ¾ 1



OKEECHOBEE COUNTY, FLORIDA NO. 34

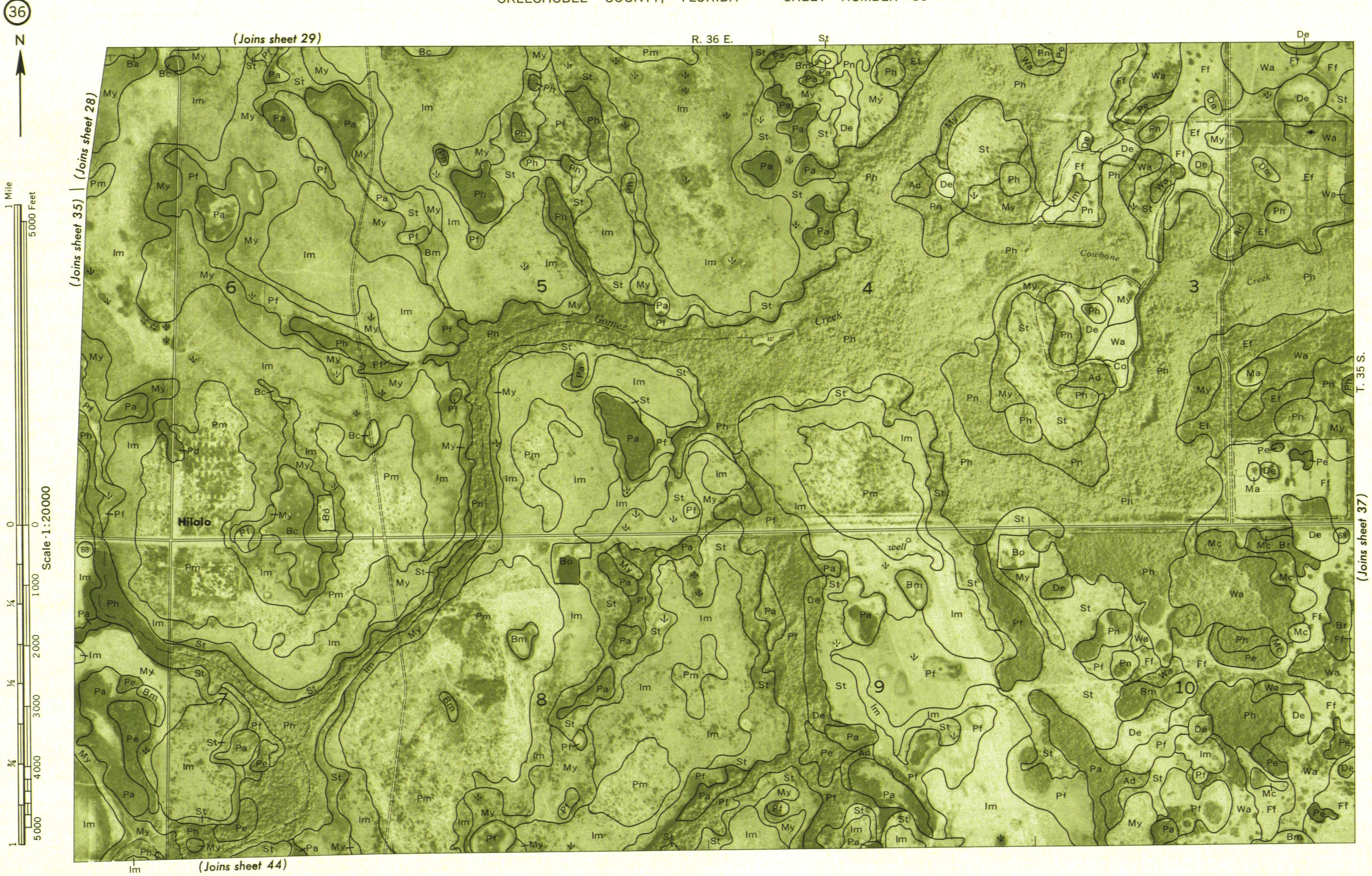
Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

Land division corners are approximately positioned on this map.



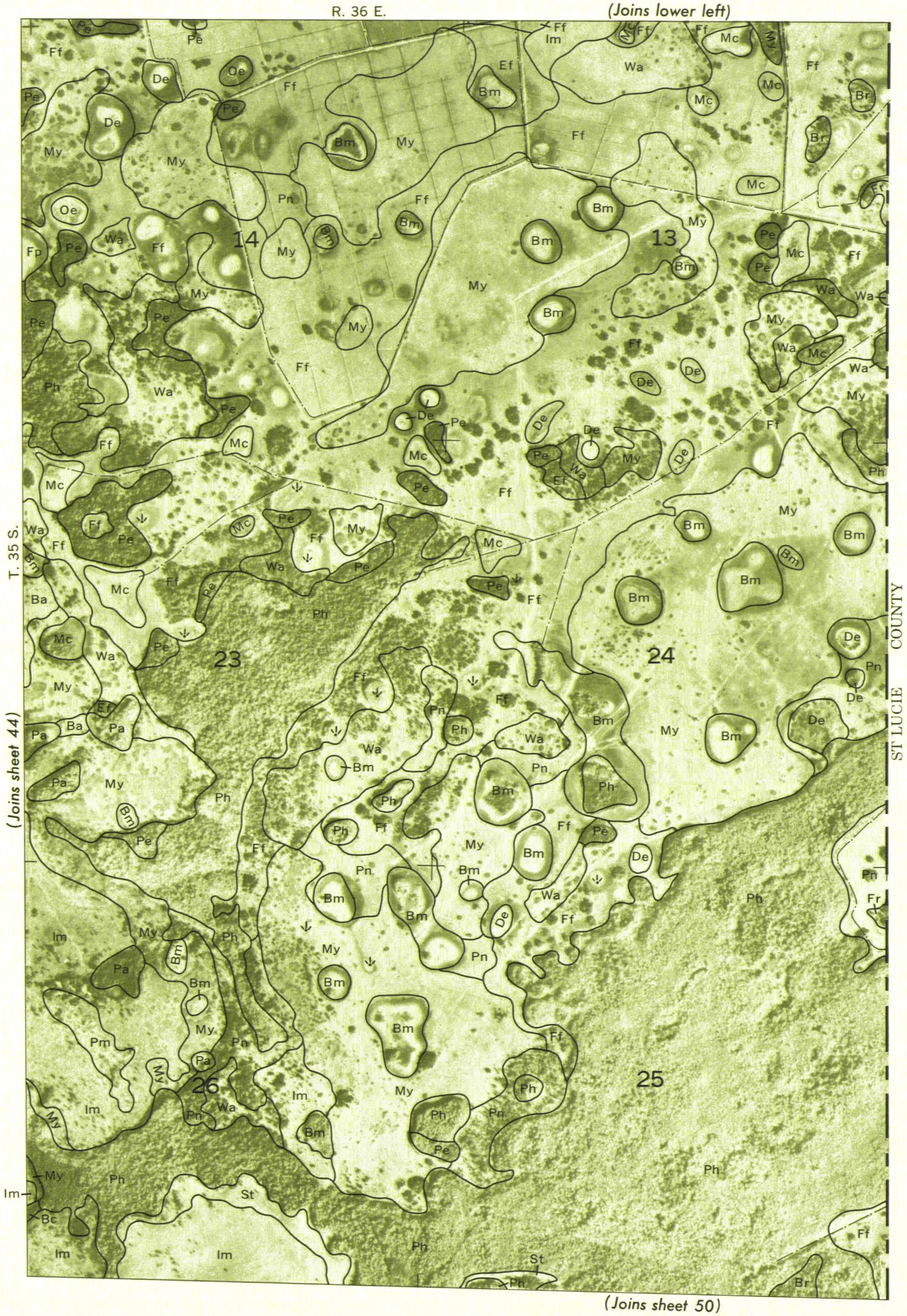
OKEECHOBEE COUNTY, FLORIDA NO. 36

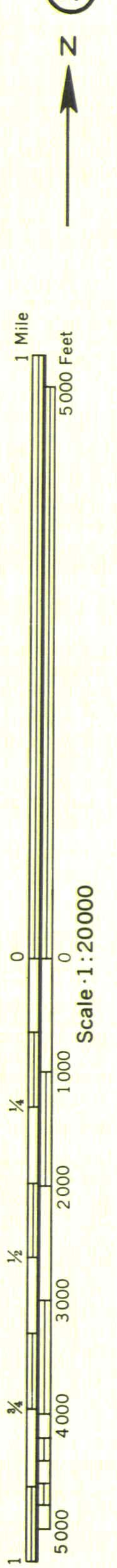
Land division corners are approximately positioned on this map.

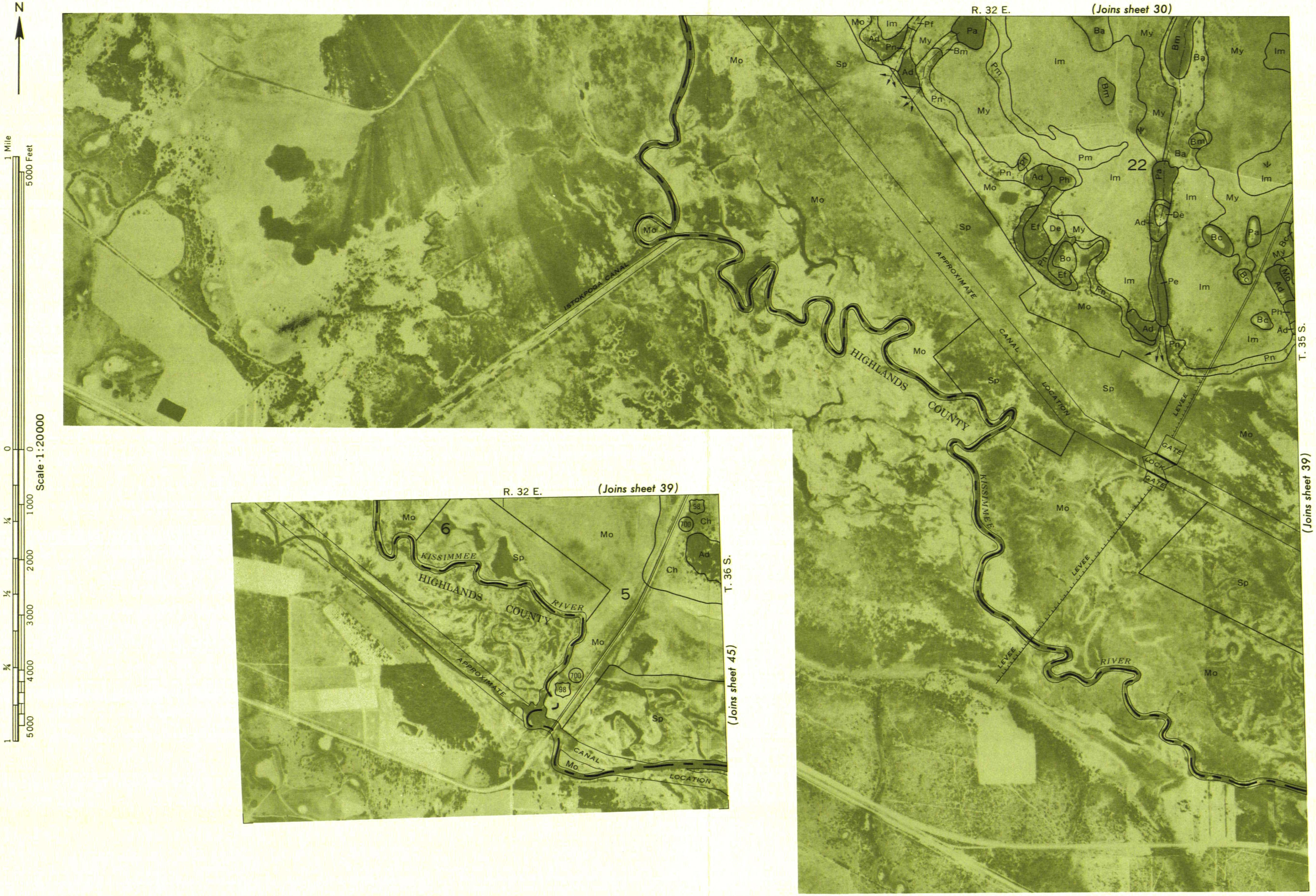
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 37







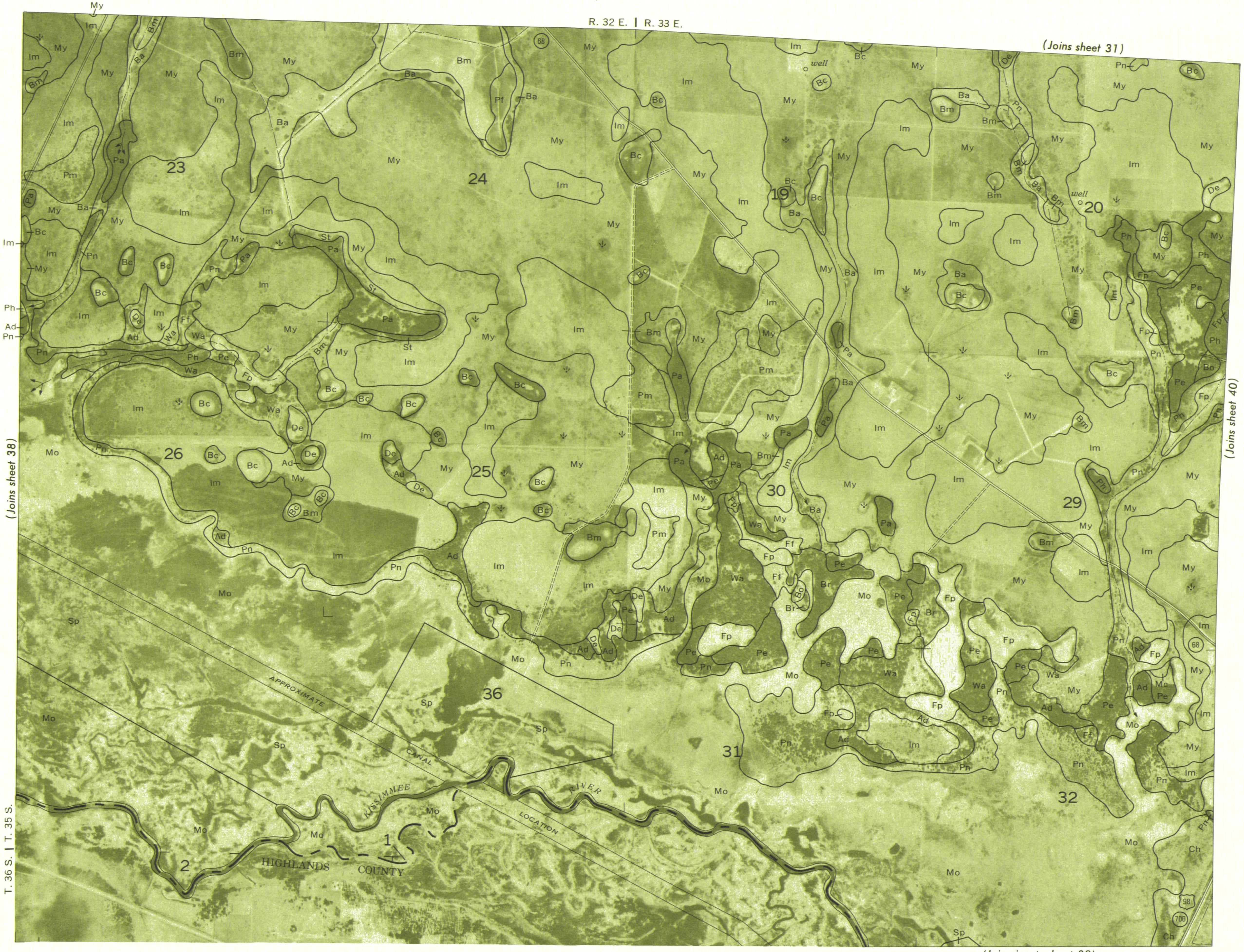
OKEECHOBEE COUNTY, FLORIDA NO. 38

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

39

N



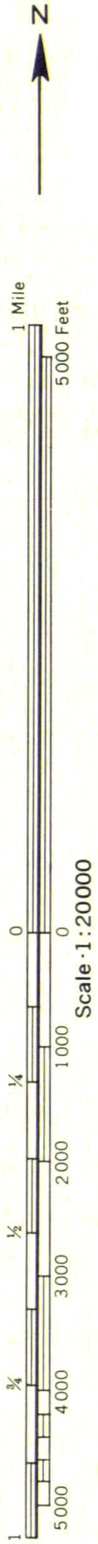
1 Mile
5000 Feet
0
¼
½
¾
1
0
1000
2000
3000
4000
5000
Scale 1:20000

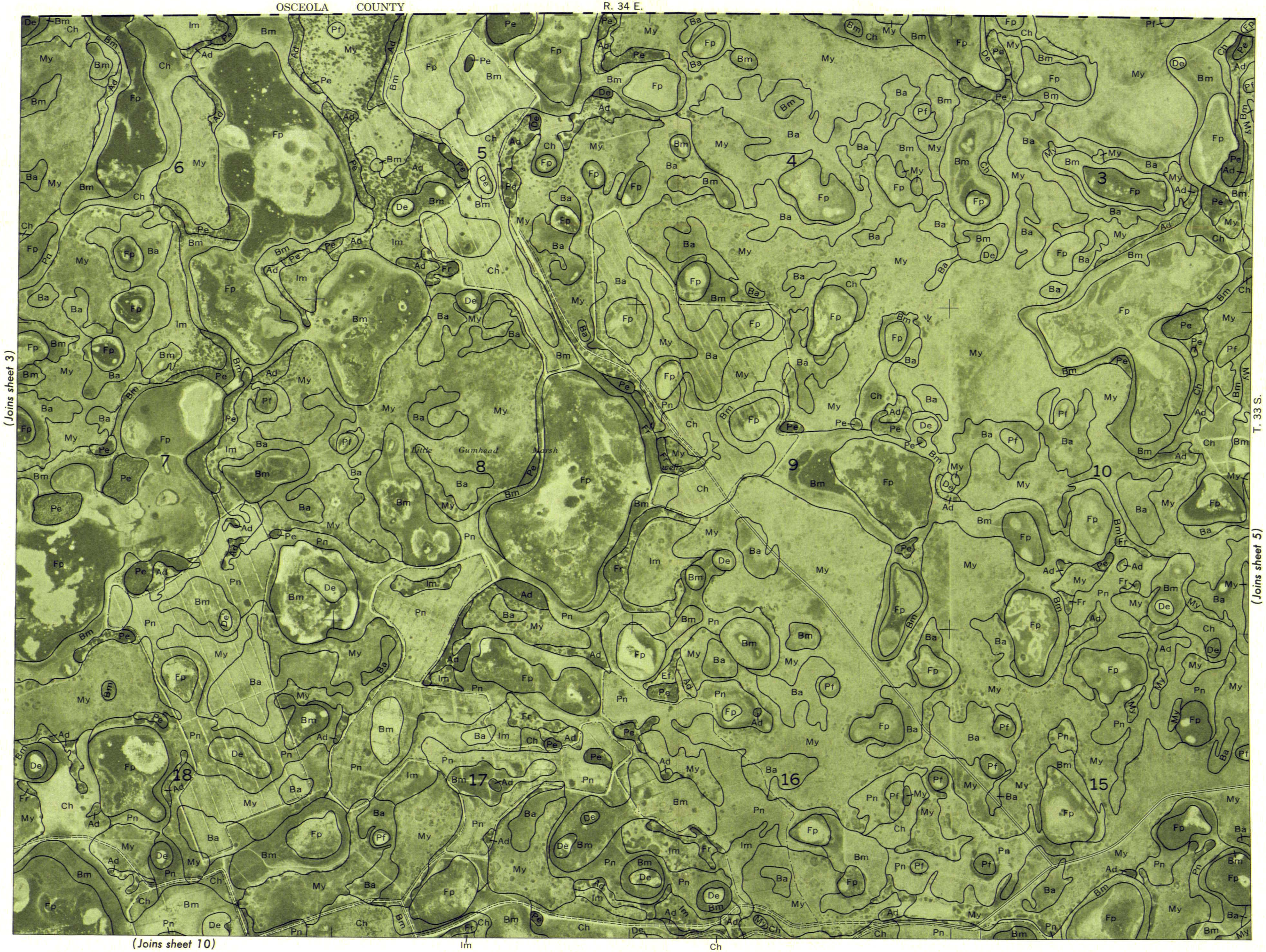
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 39

④

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 4





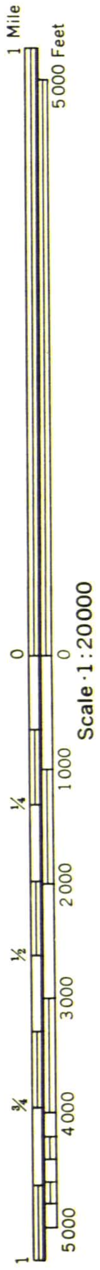
OKEECHOBEE COUNTY, FLORIDA NO. 4

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

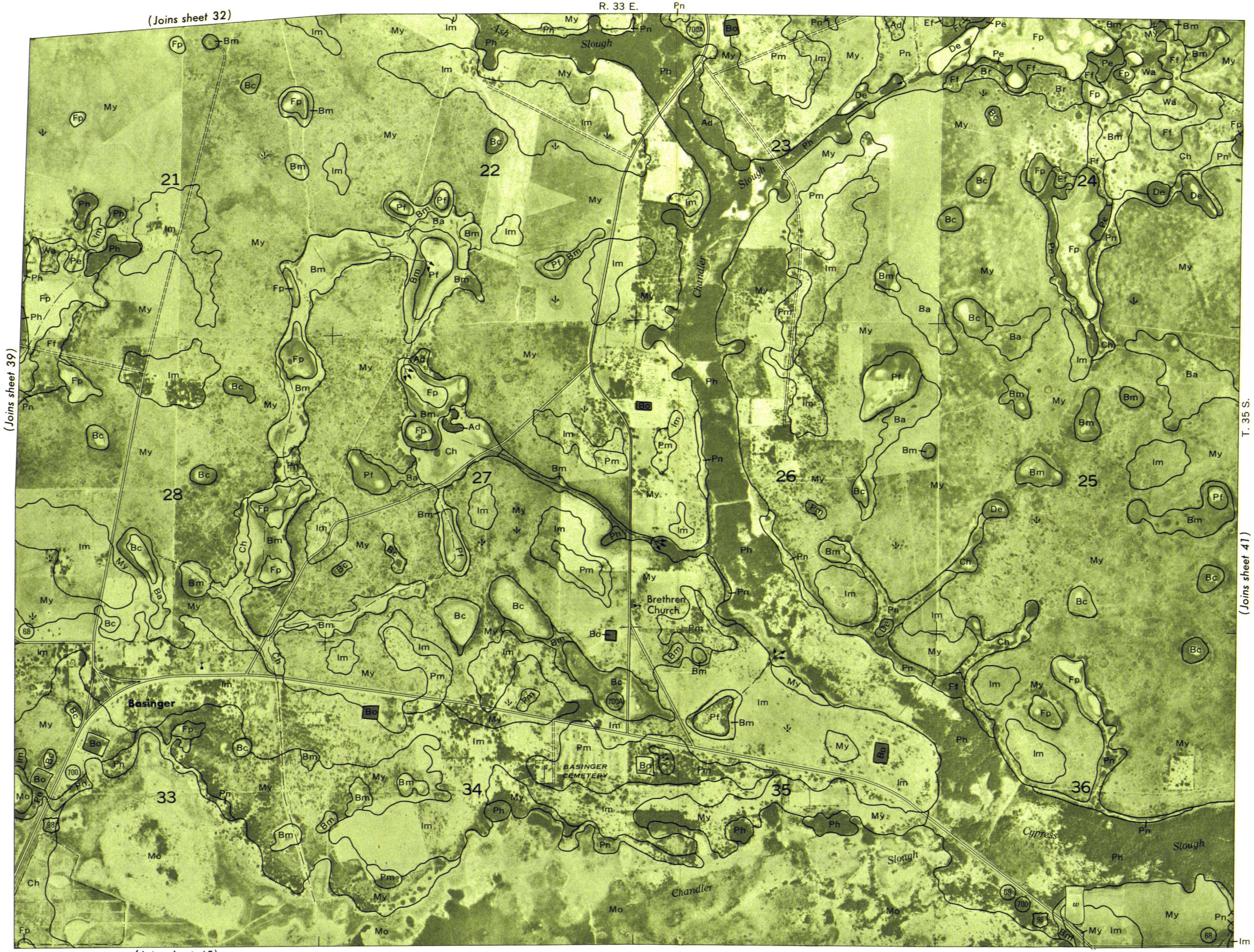
40

N



(Joins sheet 32)

R. 33 E.



(Joins sheet 39)

(Joins sheet 41)

T. 35 S.

(Joins sheet 45)

OKEECHOBEE COUNTY, FLORIDA NO. 40

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

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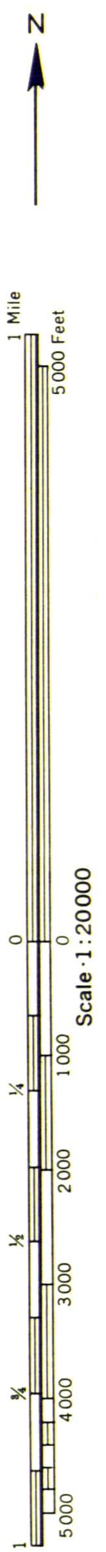
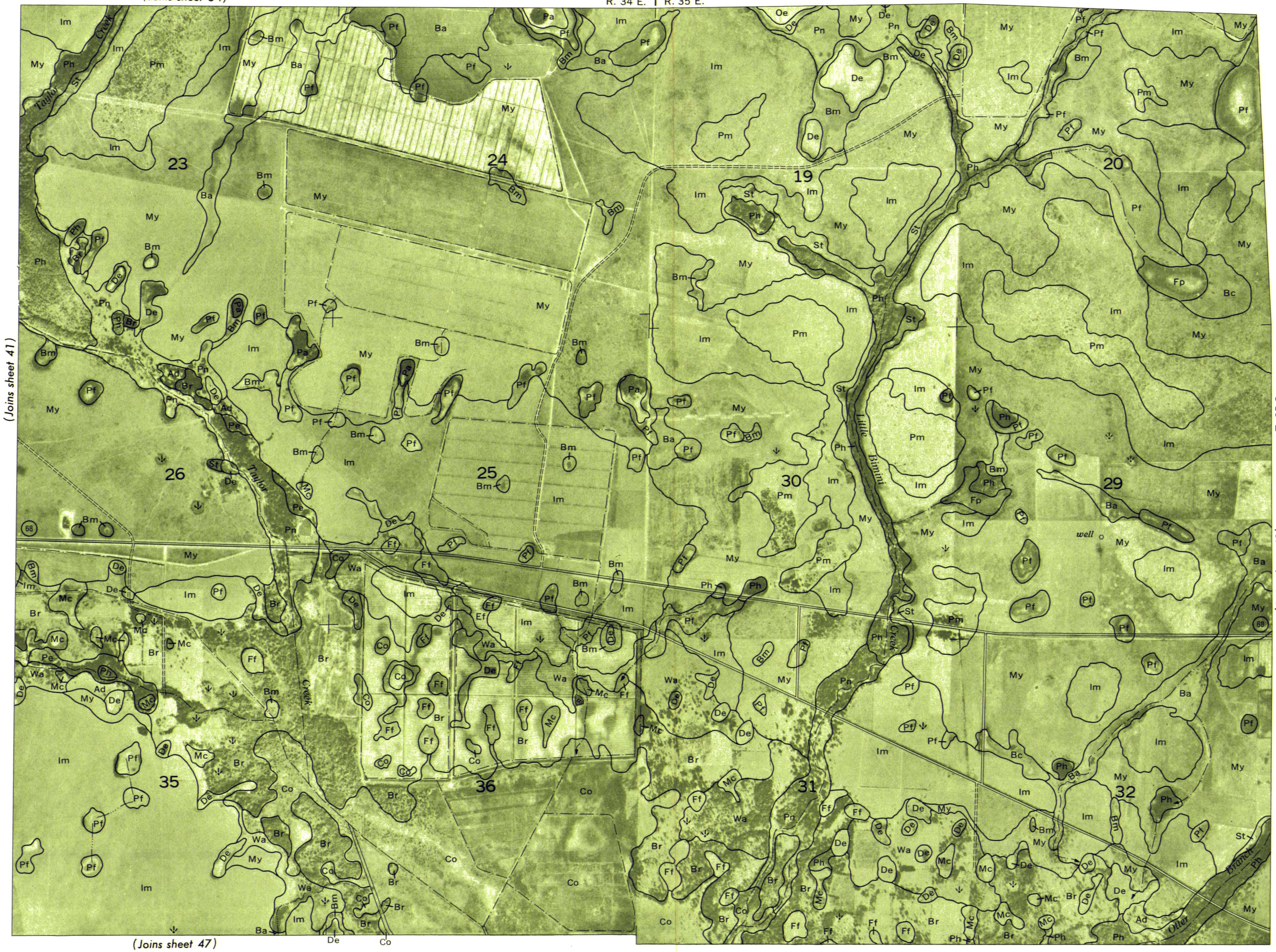
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 41

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 42





OKEECHOBEE COUNTY, FLORIDA NO. 42

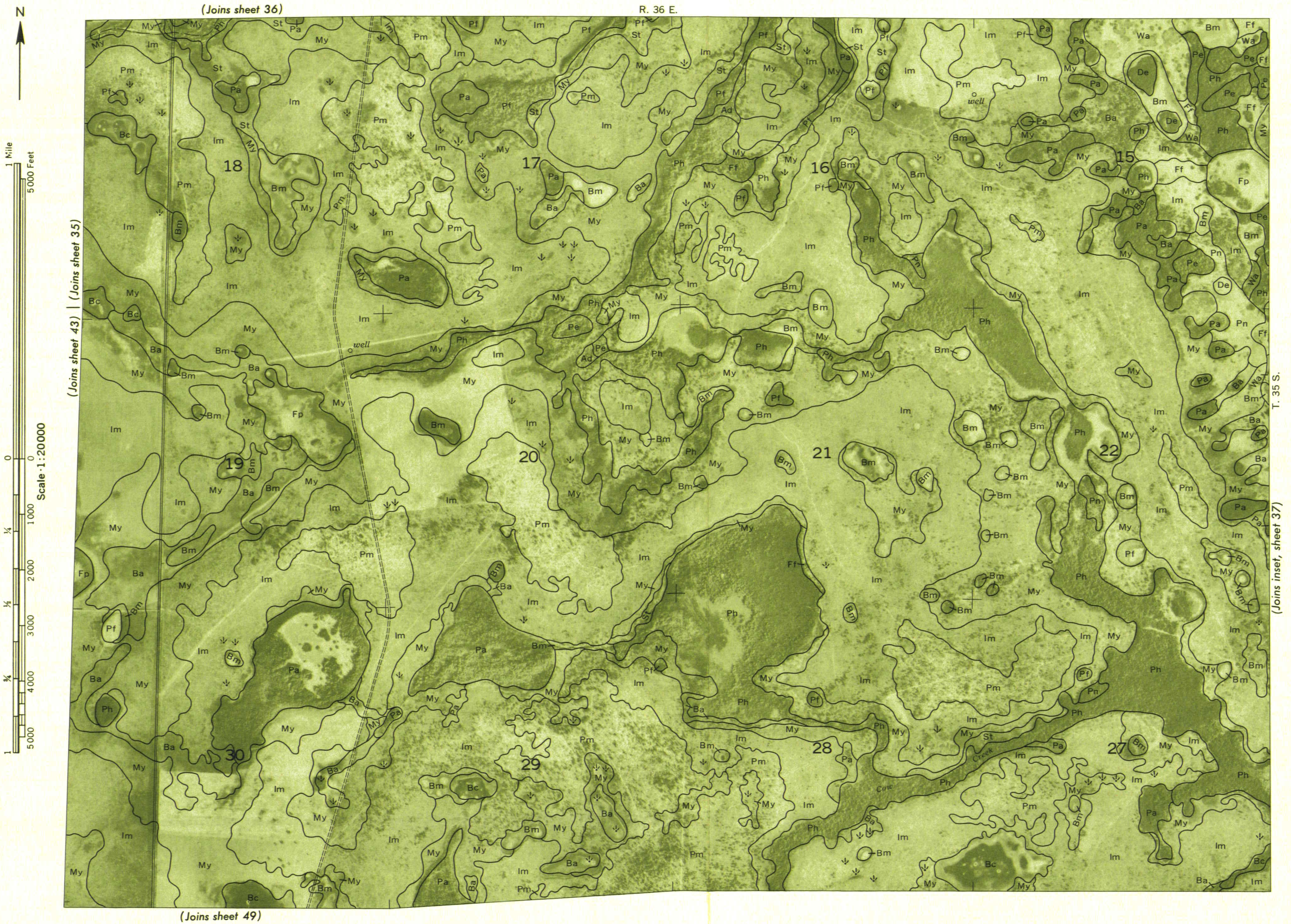
Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

This map is one of a set compiled in 19[illegible]8 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 43

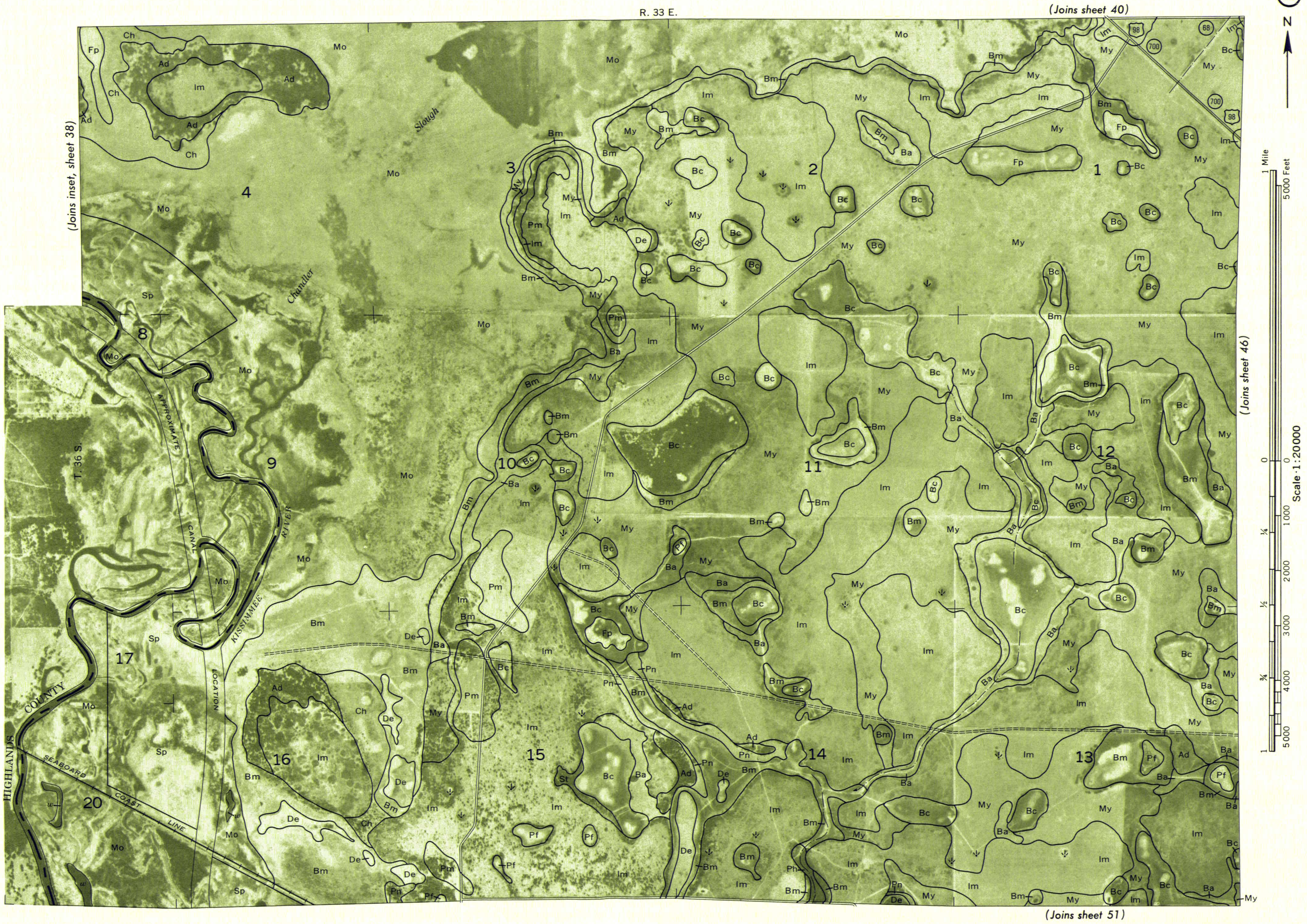
OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 44



OKEECHOBEE COUNTY, FLORIDA NO. 44

Land division corners are approximately positioned on this map.

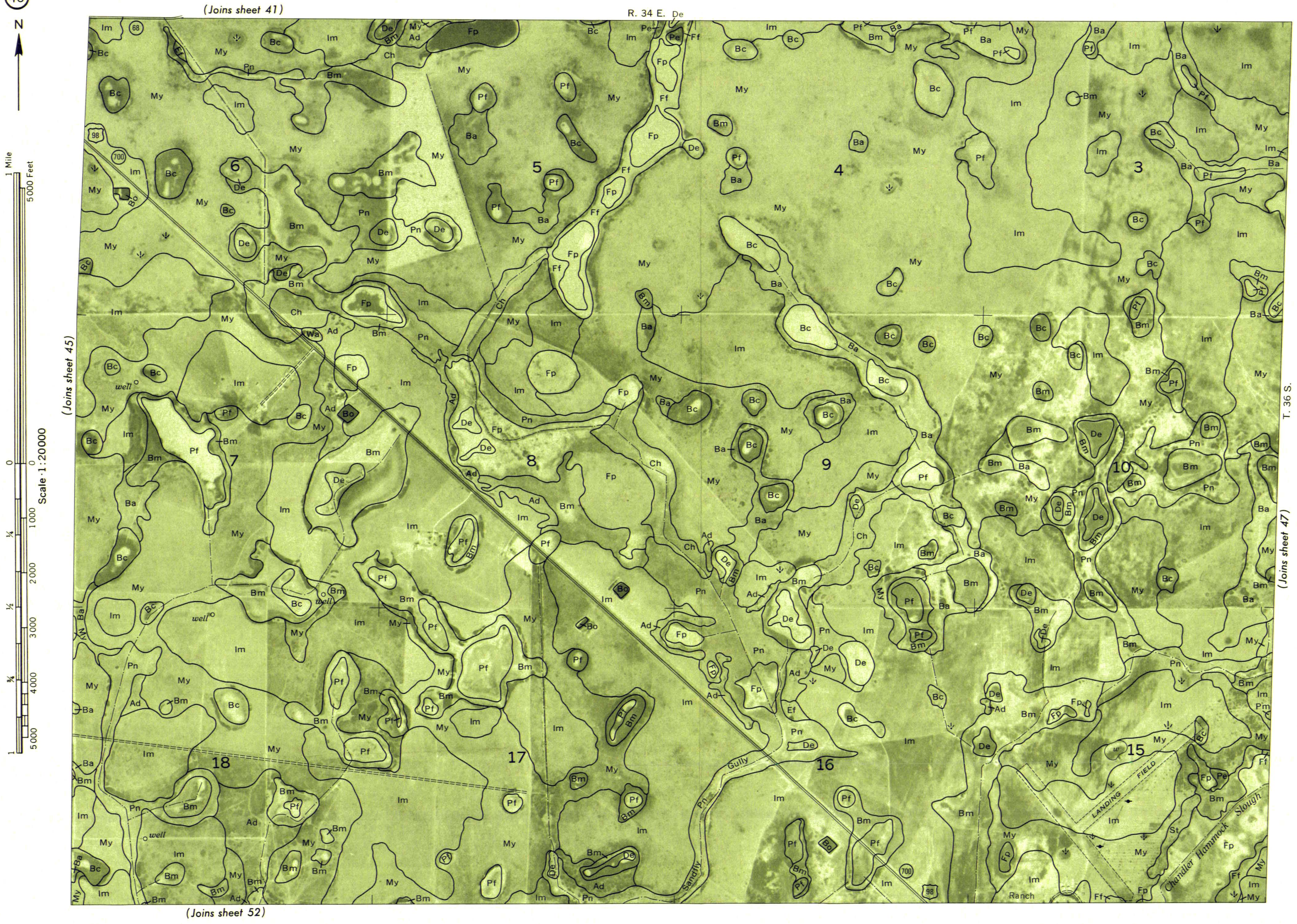
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



This map is one of a set compiled in 19[illegible]8 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 45

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 46



OKEECHOBEE COUNTY, FLORIDA NO. 46

Land division corners are approximately positioned on this map.

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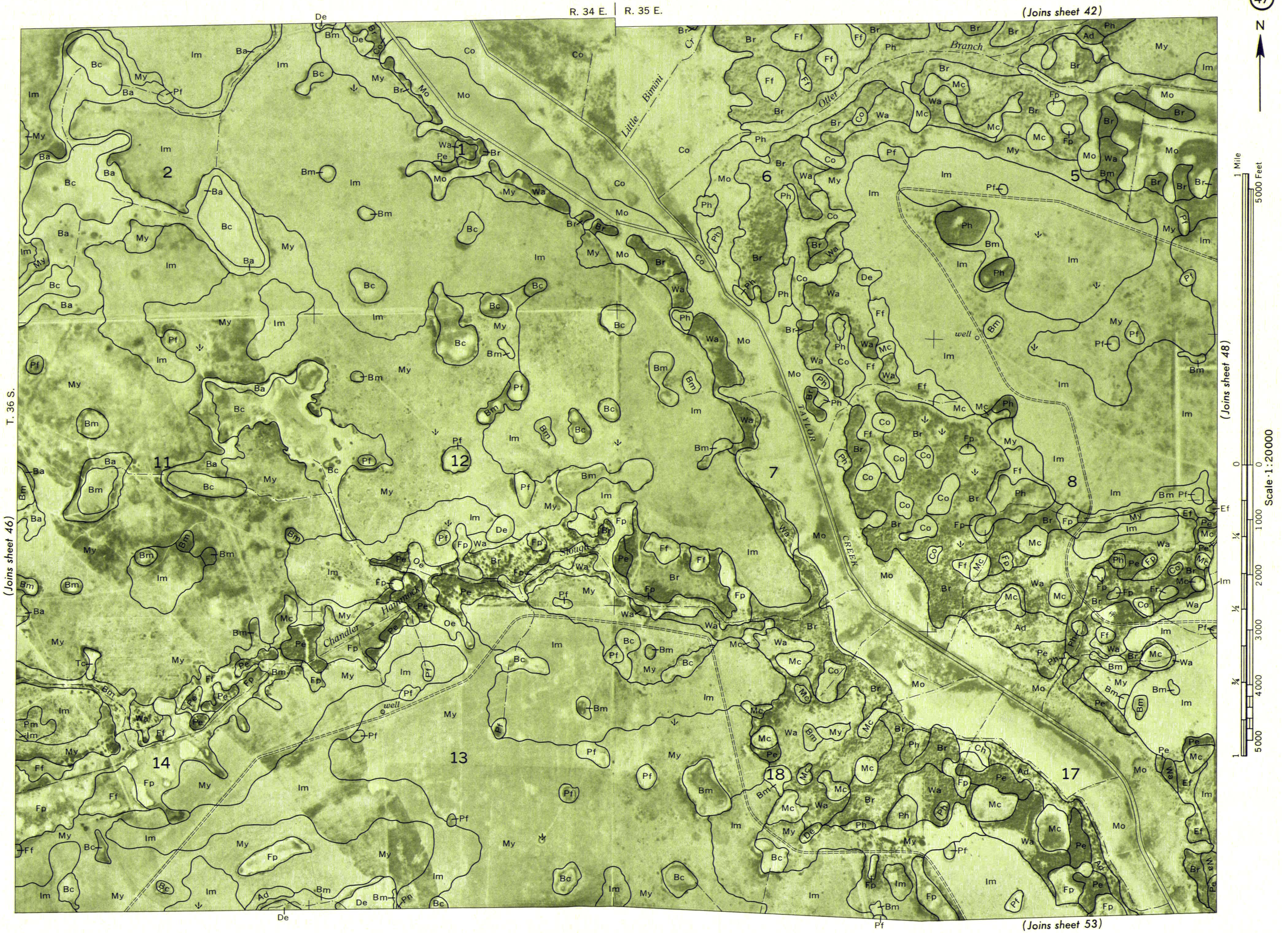
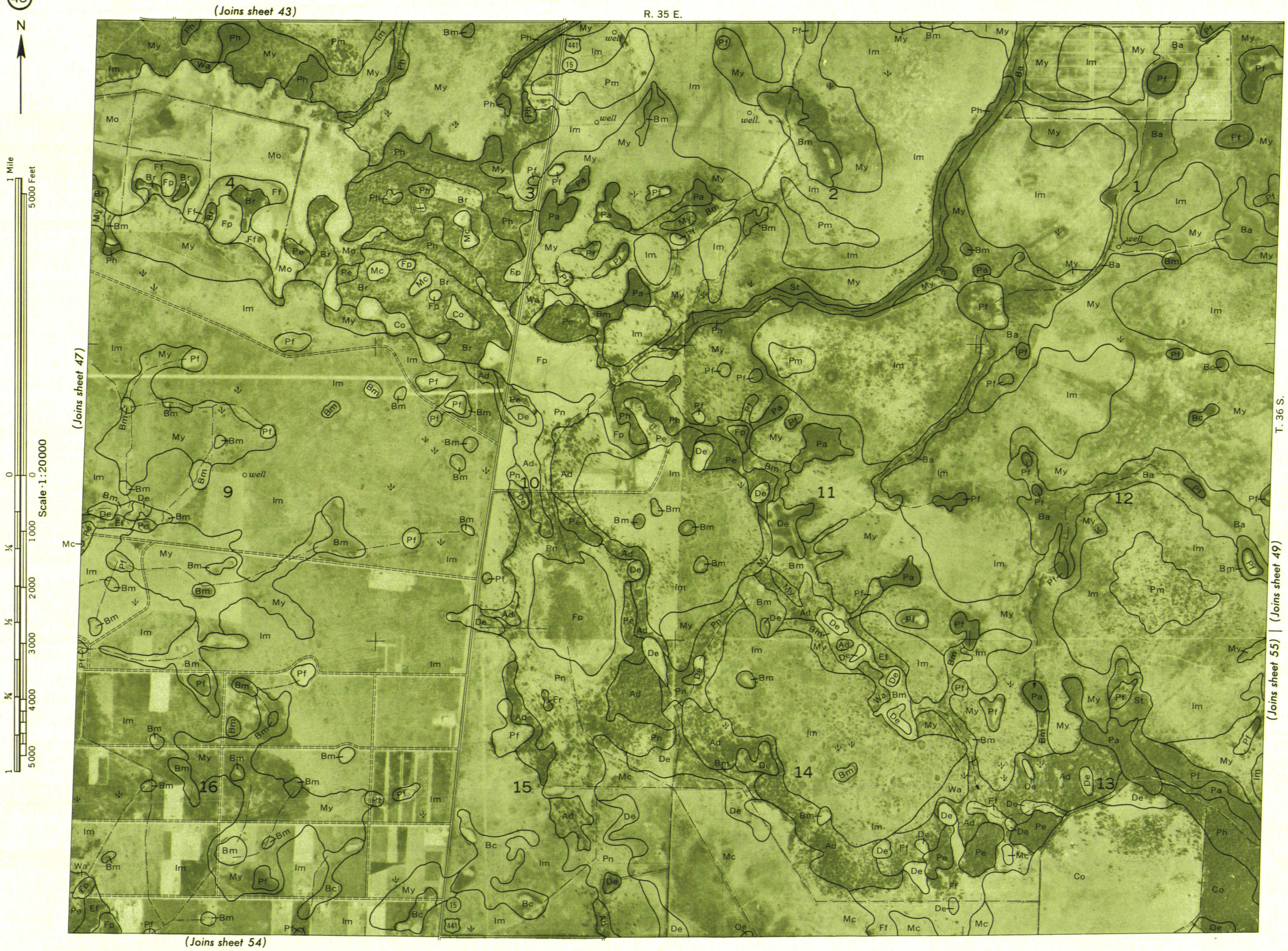
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 47

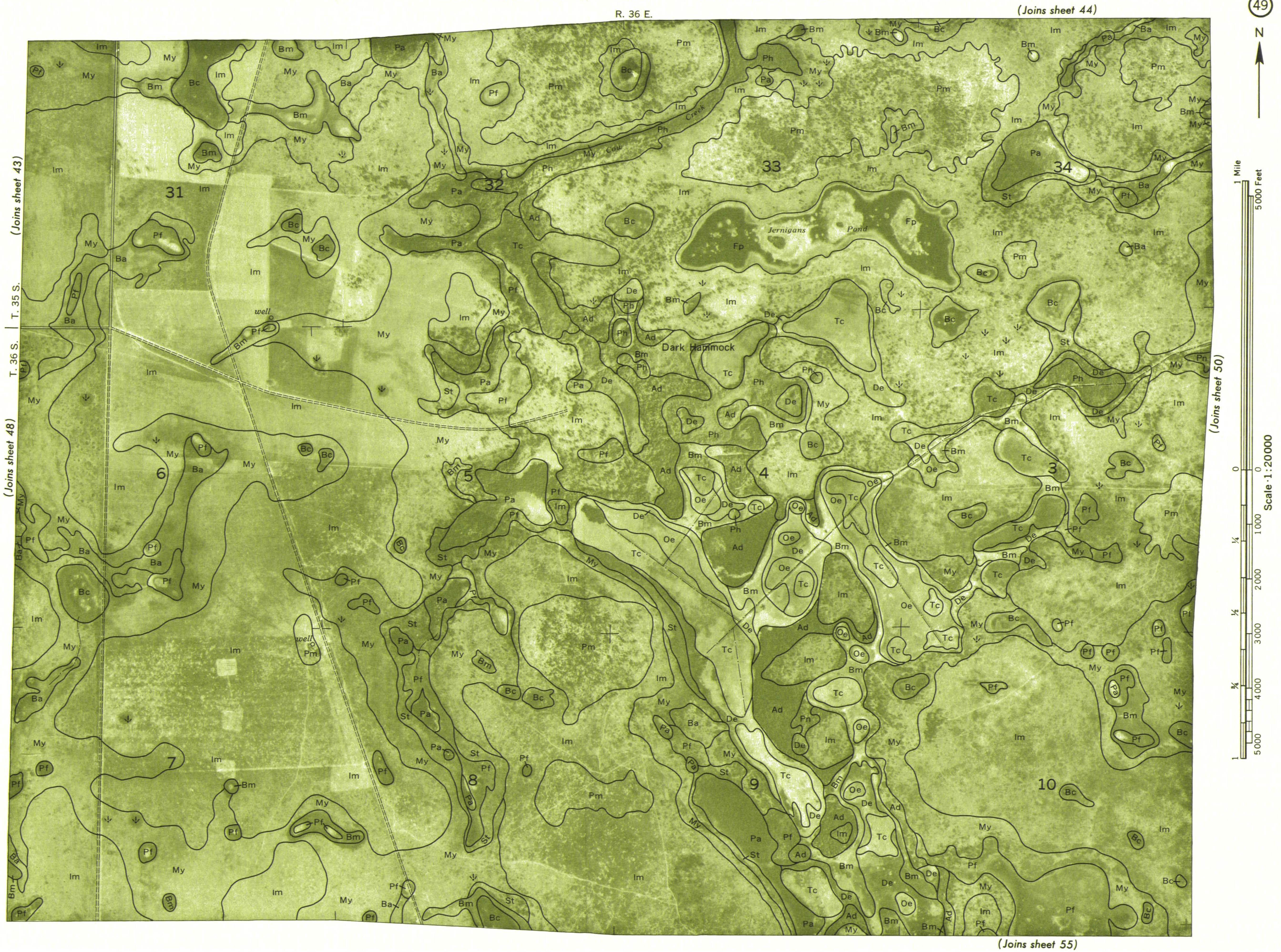




OKEECHOBEE COUNTY, FLORIDA NO. 48

Land division corners are approximately positioned on this map.

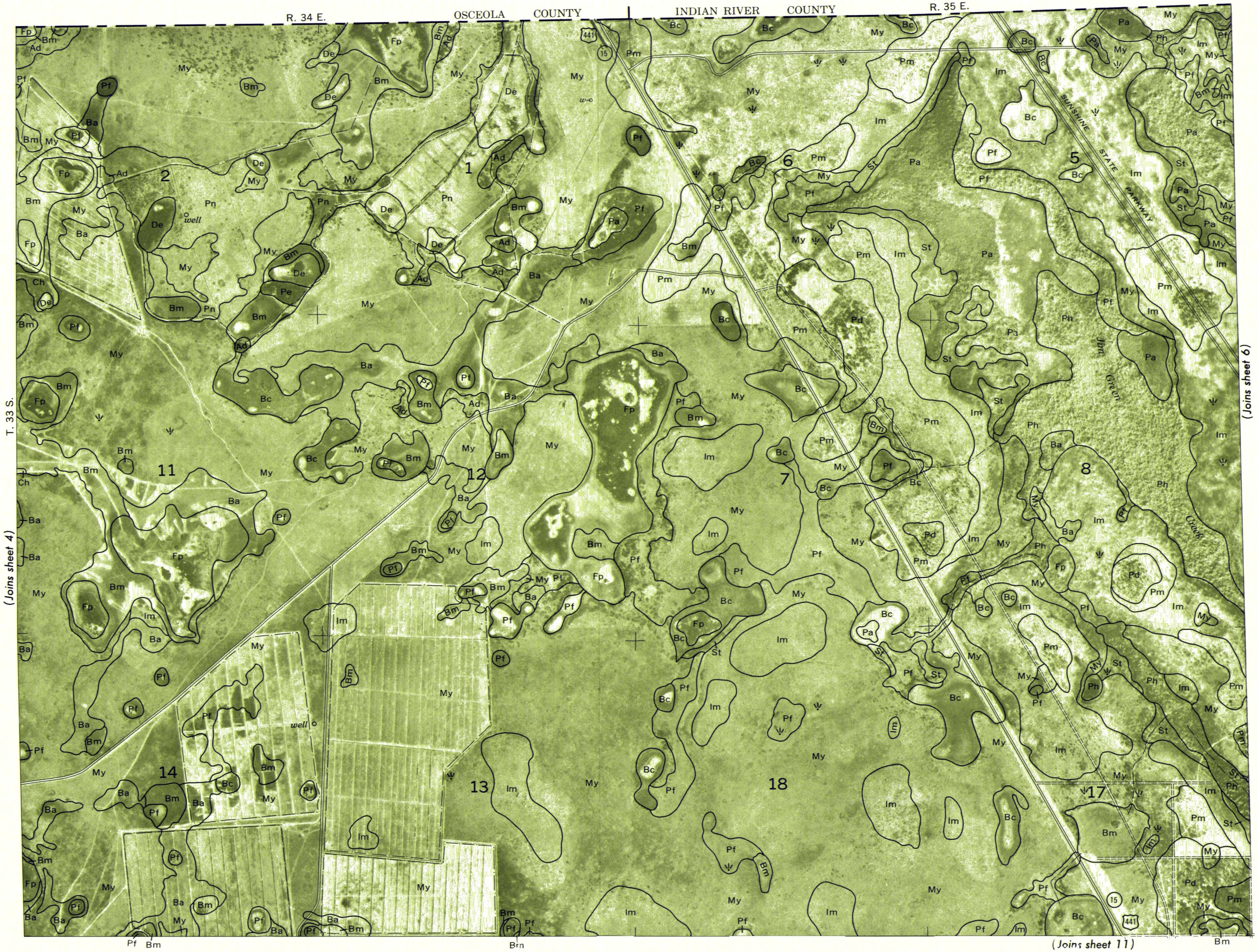
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 49

5



N

Scale 1:20000

1 Mile

5000 Feet

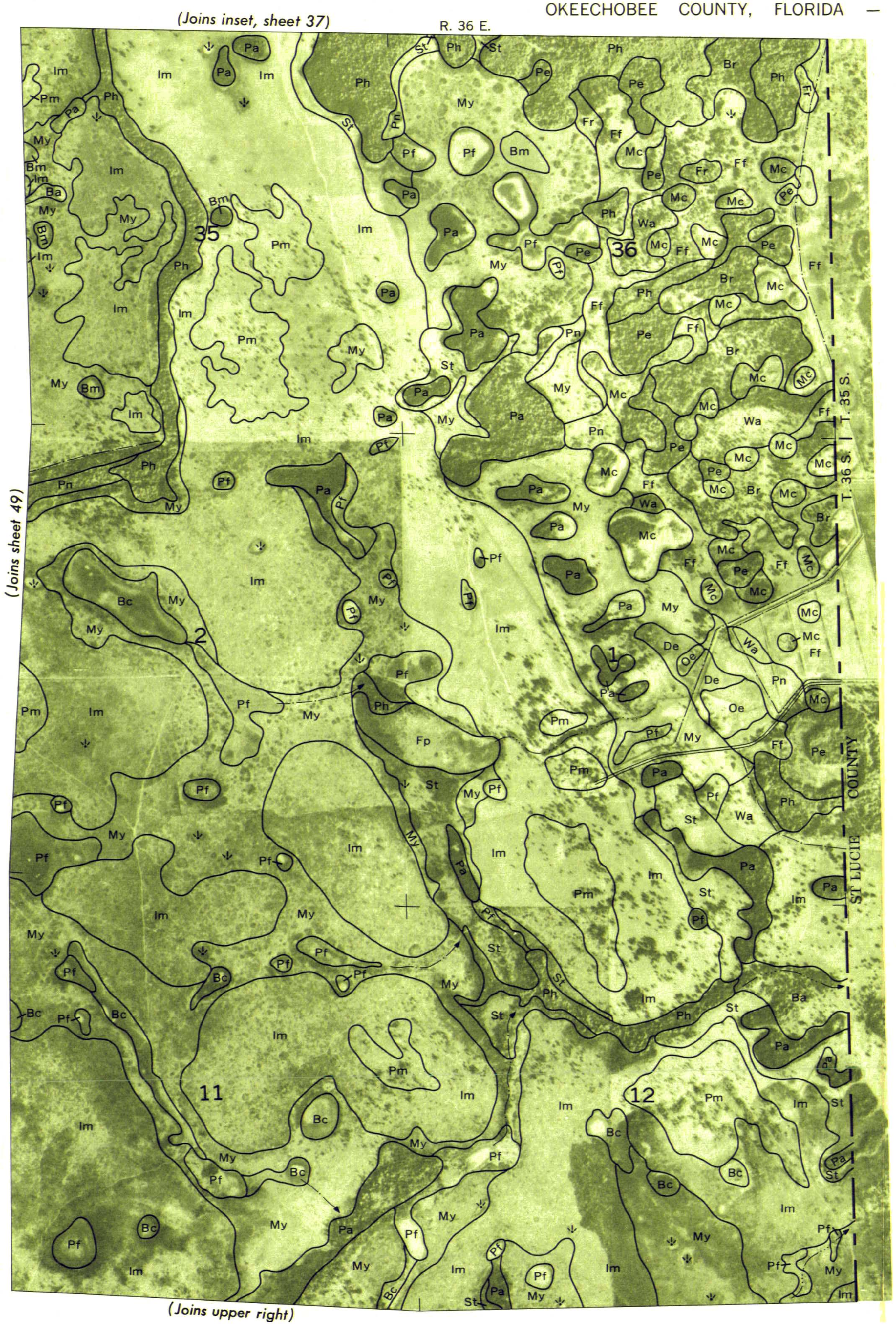
0 ¼ ½ ¾ 1

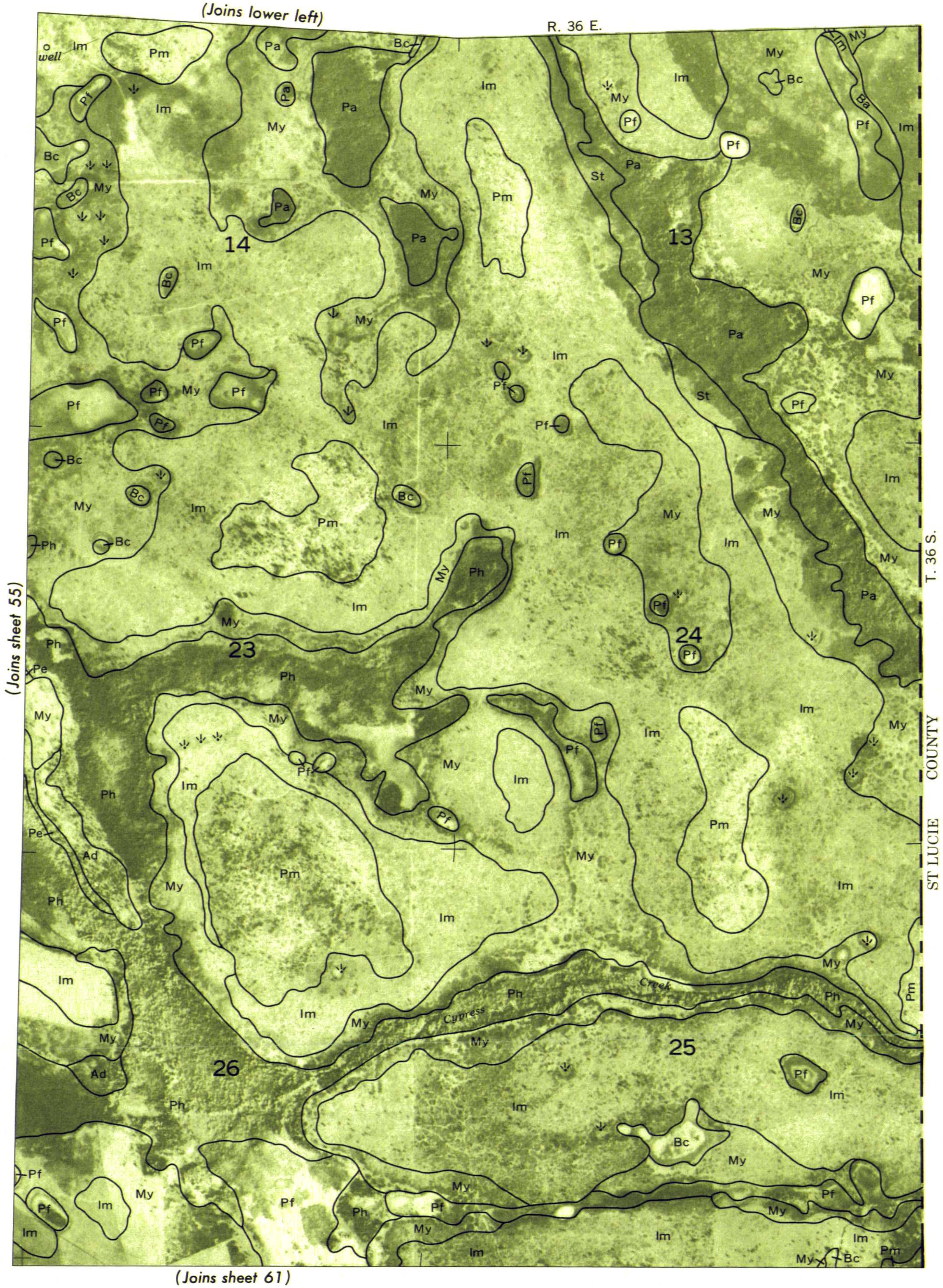
0 1000 2000 3000 4000 5000

OKEECHOBEE COUNTY, FLORIDA NO. 5

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.





OKEECHOBEE COUNTY, FLORIDA NO. 50

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

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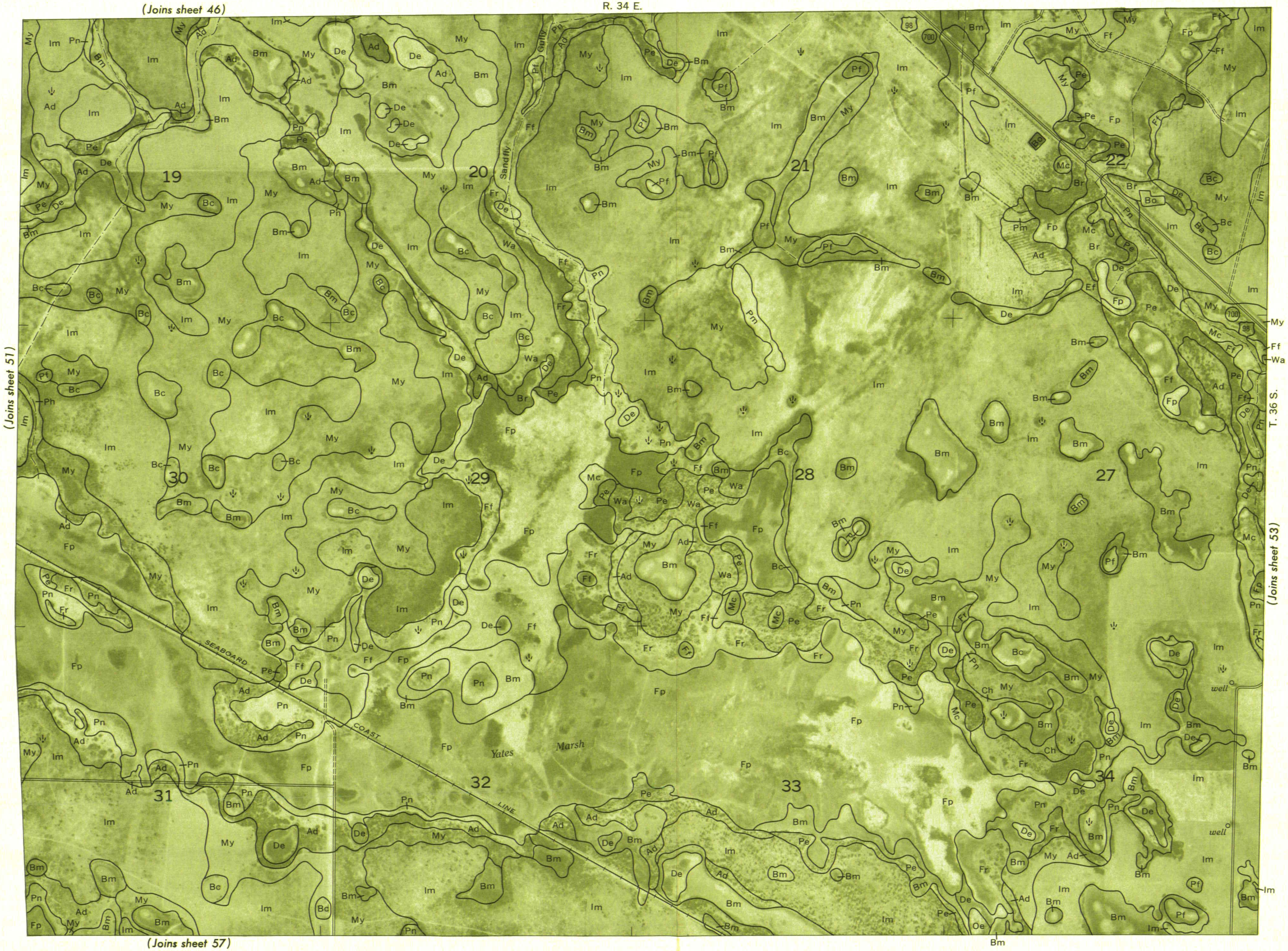
Land division corners are approximately positioned on this map.



N

1 Mile 5000 Feet

Scale 1:20000

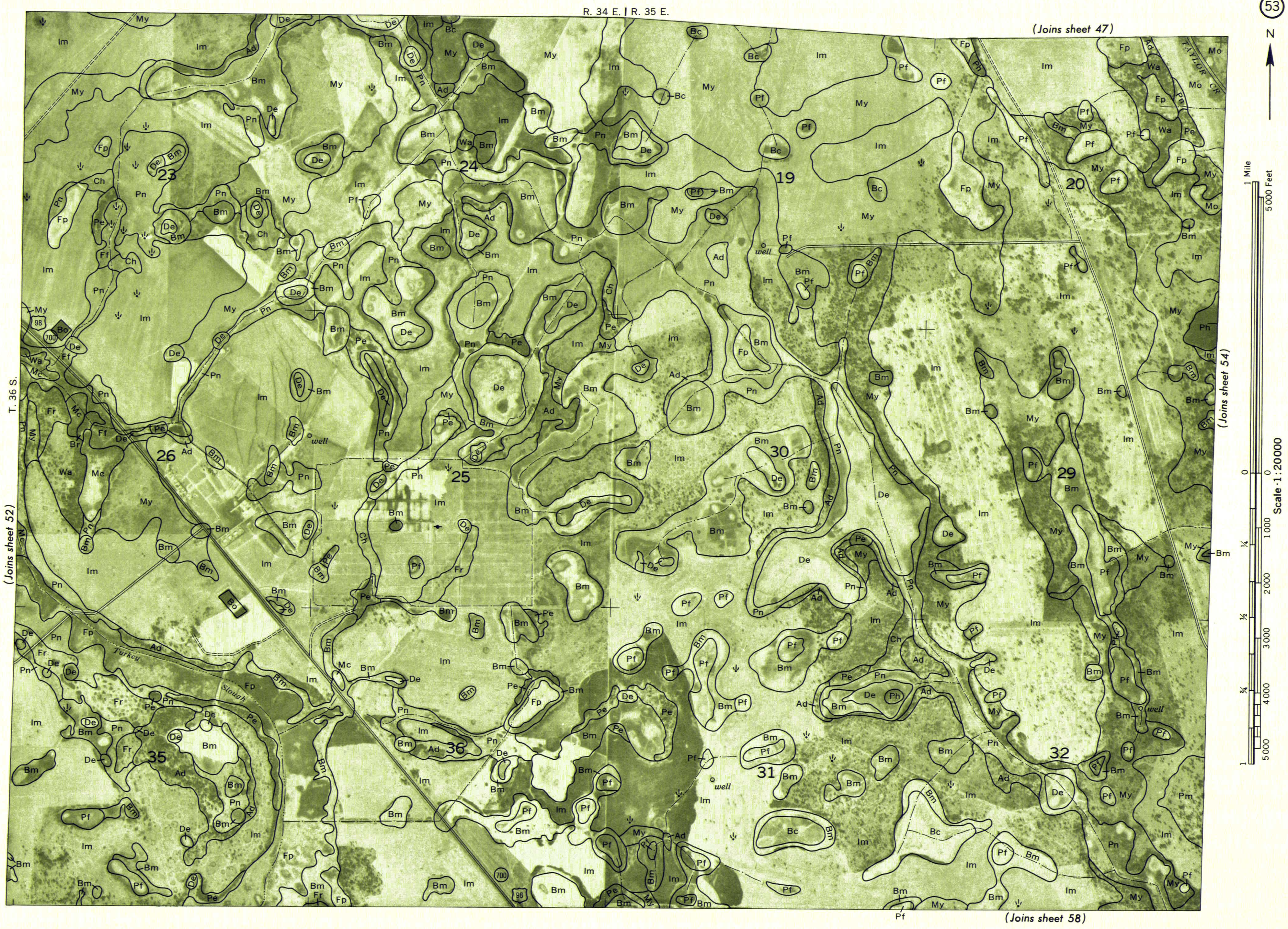
0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

OKEECHOBEE COUNTY, FLORIDA NO. 52

Land division corners are approximately positioned on this map.

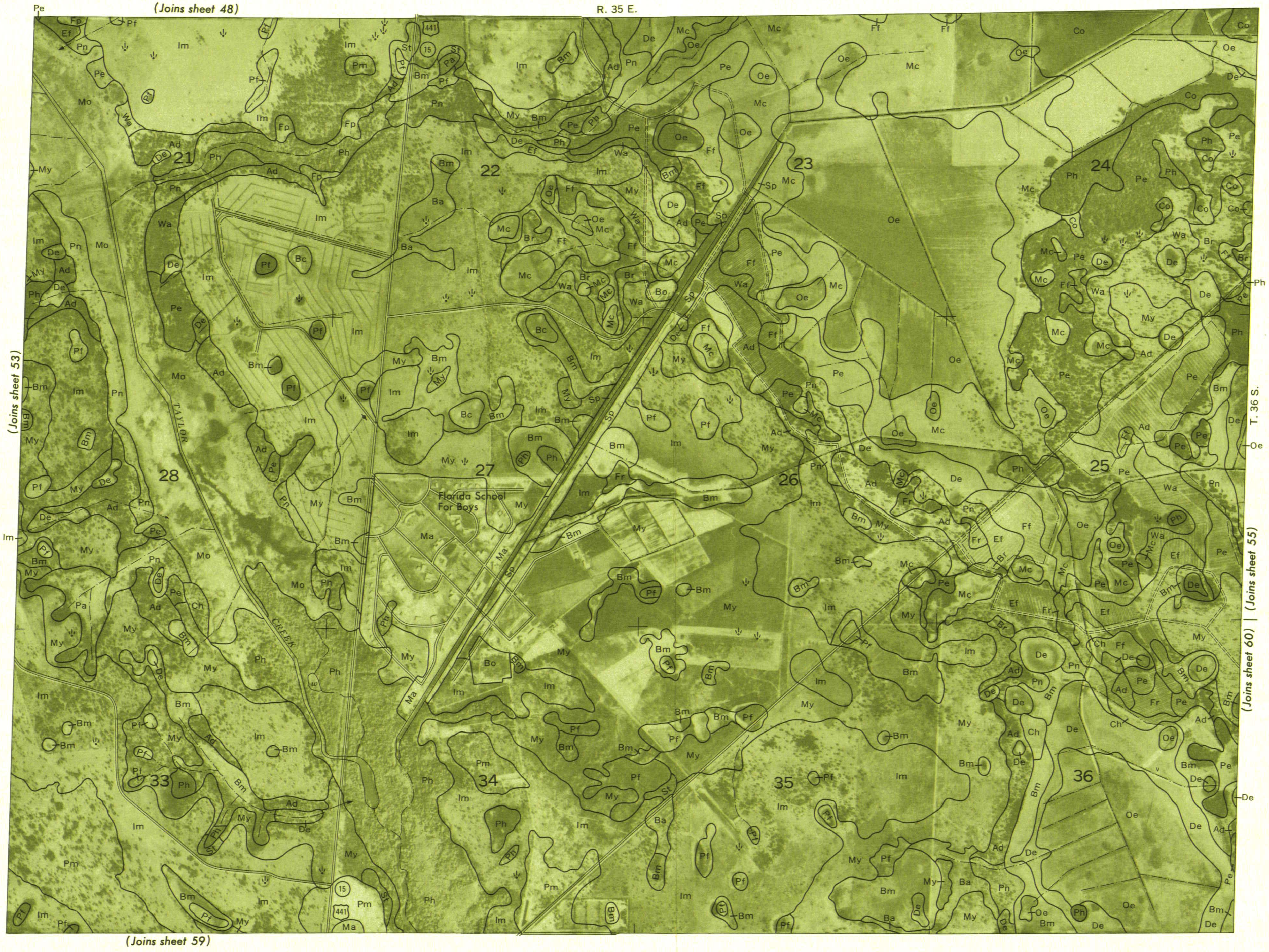
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

54

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 54



N

Scale 1:20000

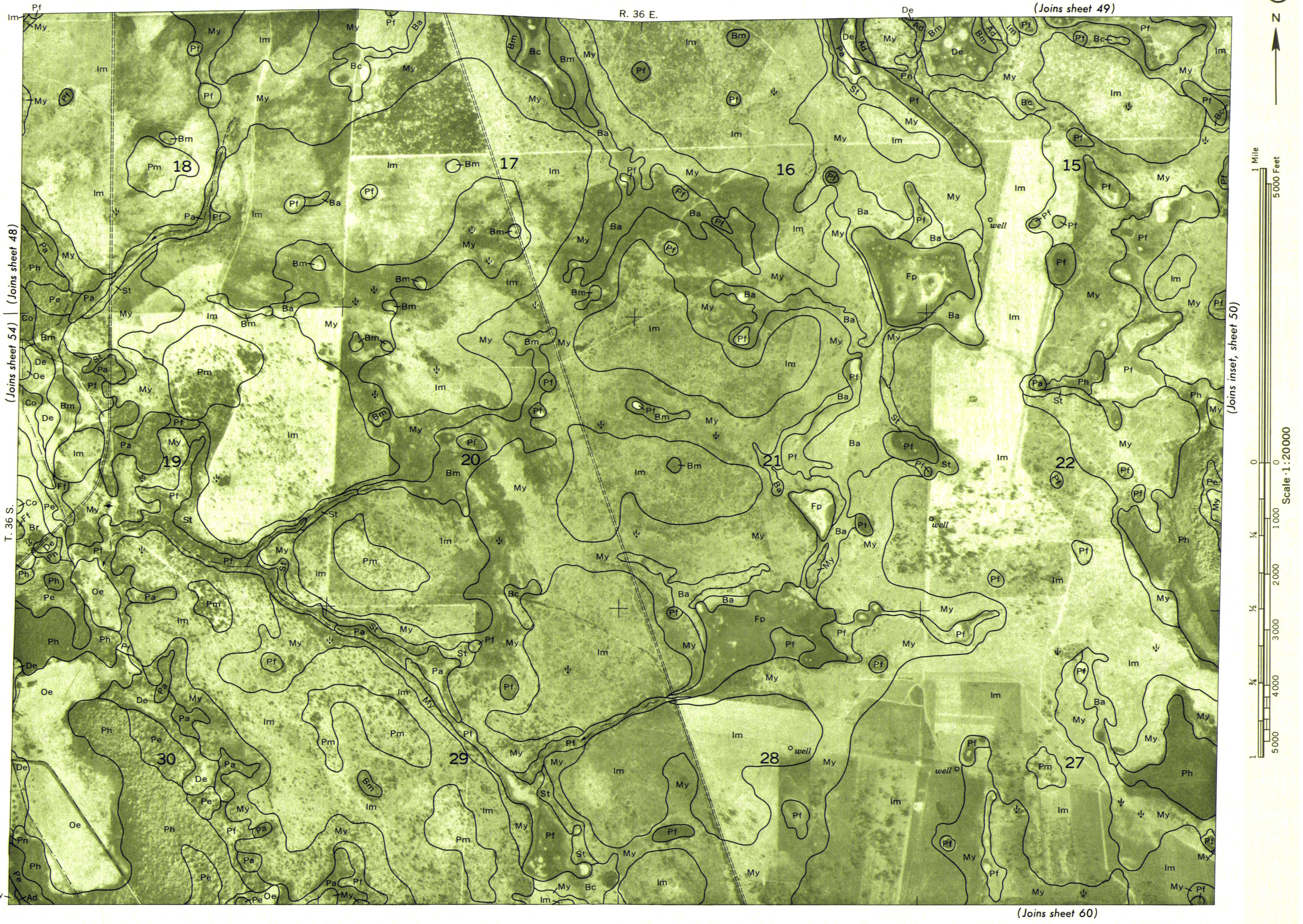
1 Mile — ¾ — ½ — ¼ — 0

5000 Feet — 4000 — 3000 — 2000 — 1000 — 0

OKEECHOBEE COUNTY, FLORIDA NO. 54

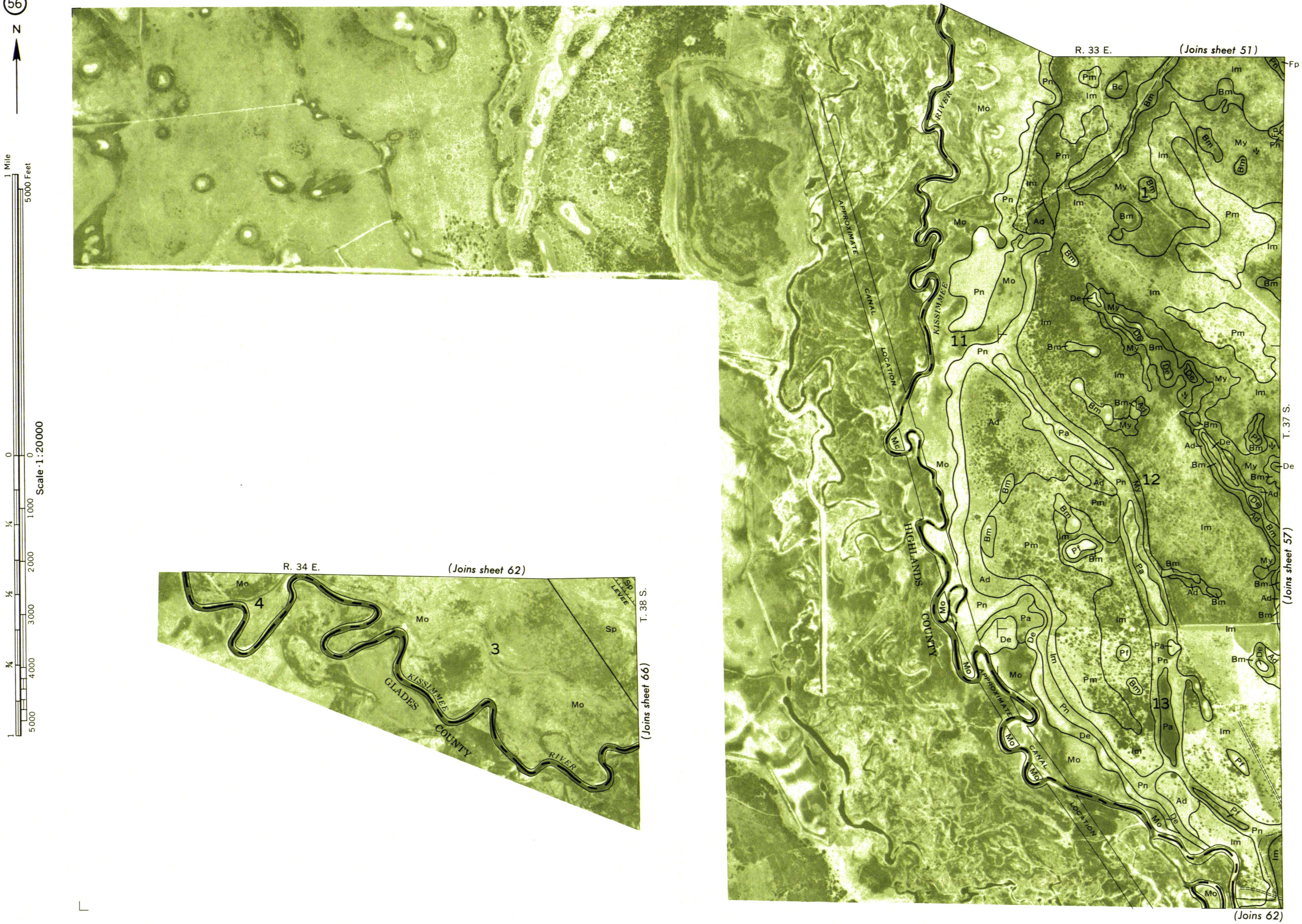
Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

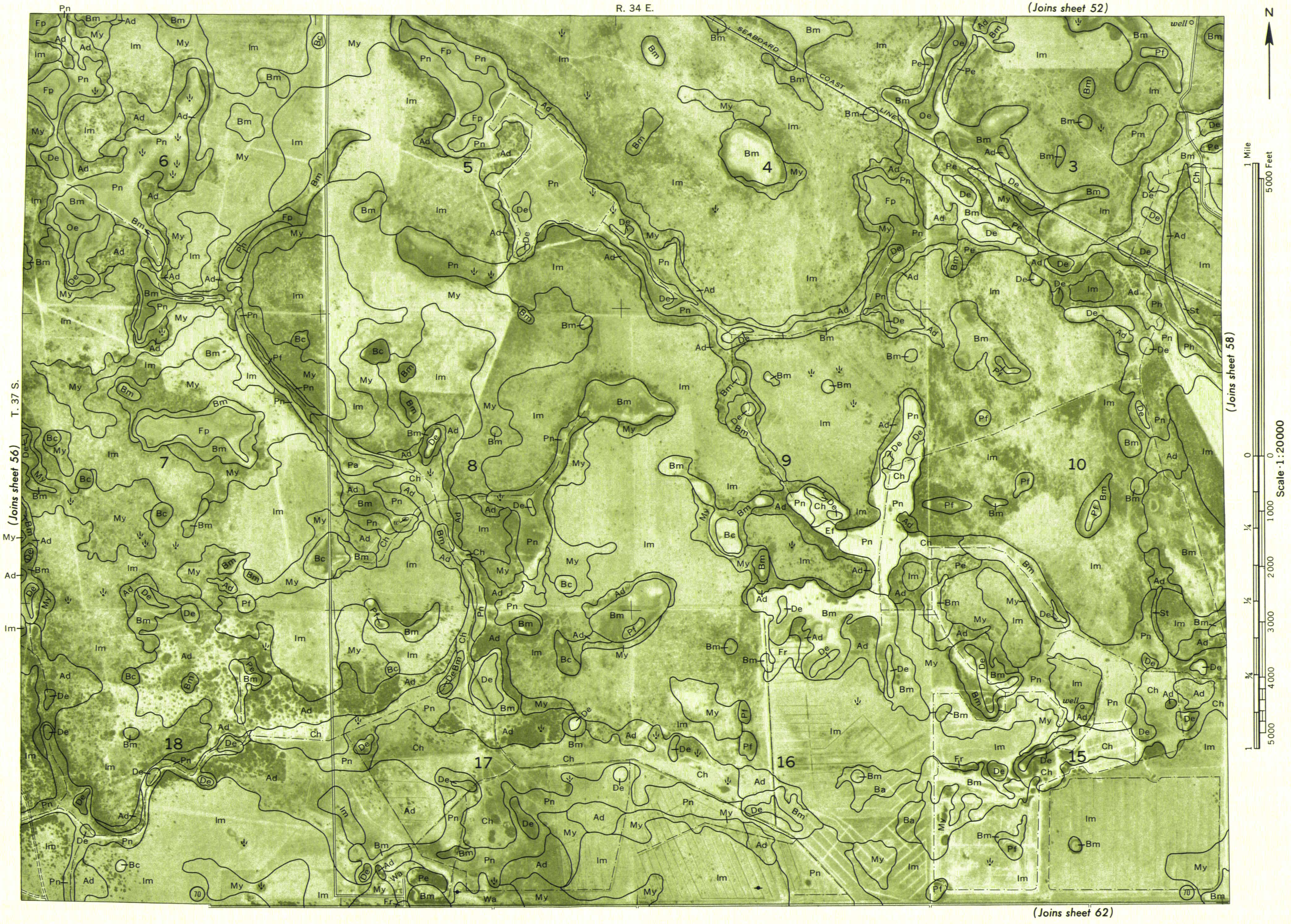
OKEECHOBEE COUNTY, FLORIDA NO. 55



OKEECHOBEE COUNTY, FLORIDA NO. 56

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 57

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 58

N

1 Mile
5000 Feet
Scale 1:20000
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000

OKEECHOBEE COUNTY, FLORIDA NO. 58

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 59

6

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 6

N

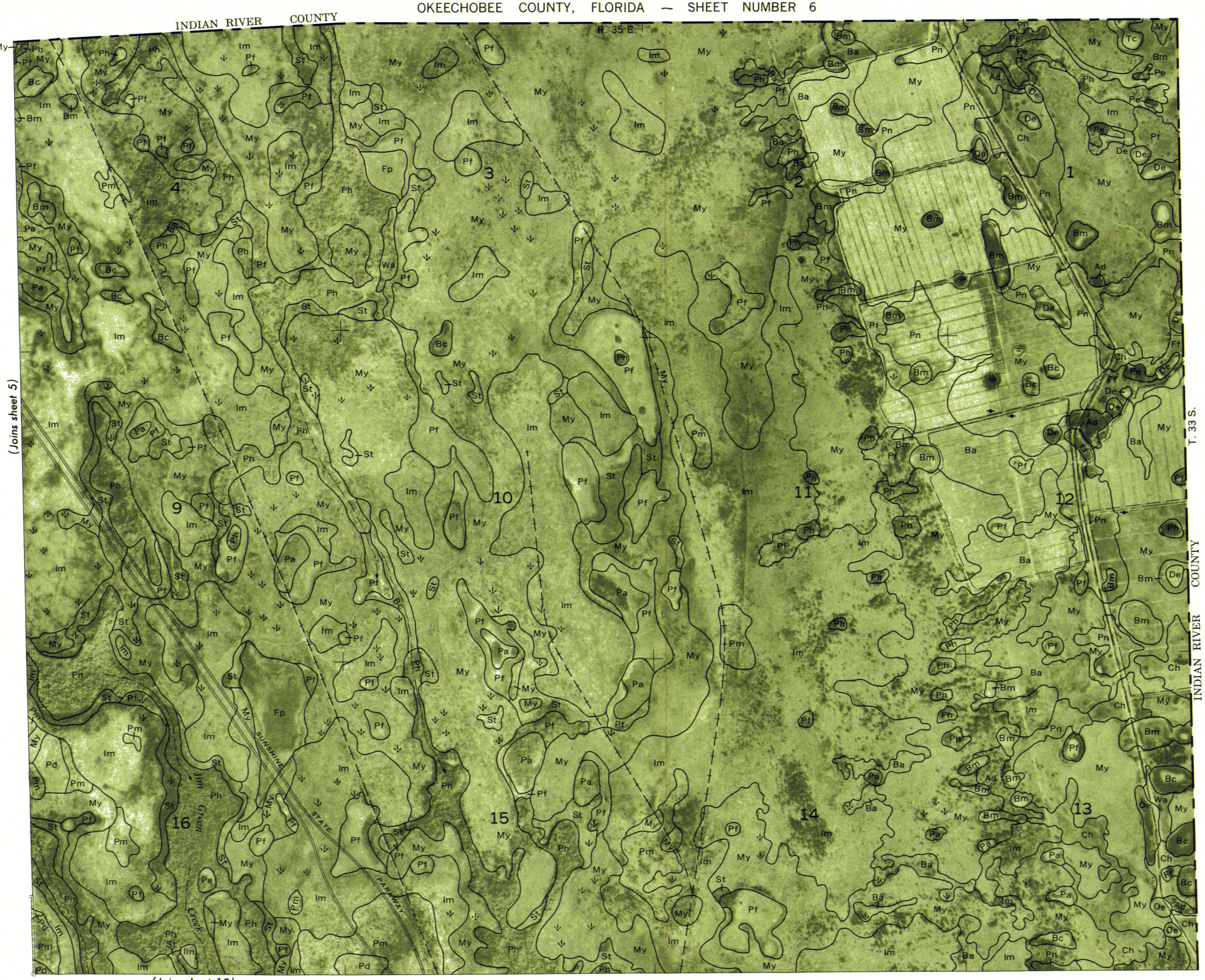
1 Mile

5000 Feet

Scale 1:20000

0 1000 2000 3000 4000 5000

(Joins sheet 5)

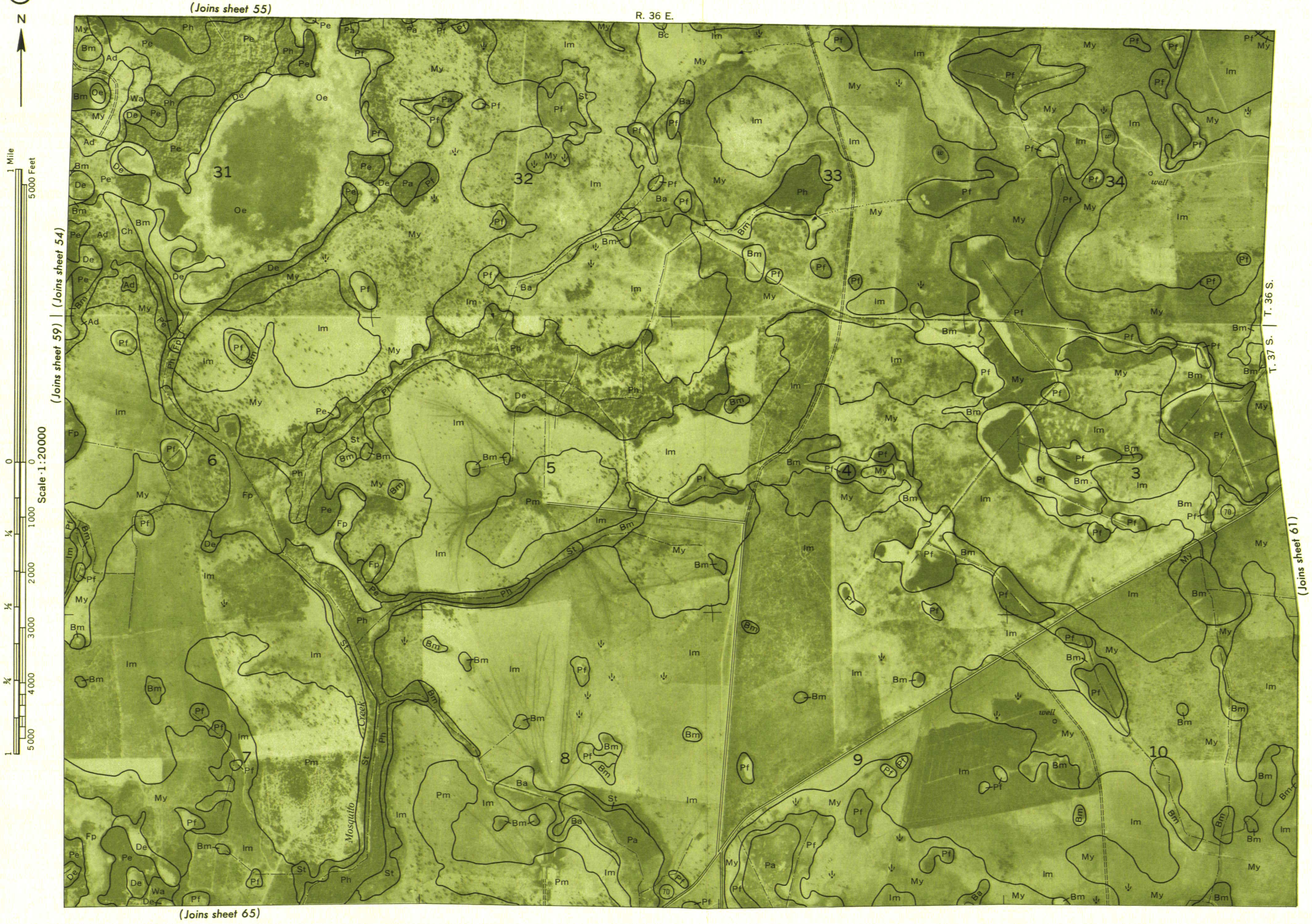


(Joins sheet 12)

OKEECHOBEE COUNTY, FLORIDA NO. 6

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



OKEECHOBEE COUNTY, FLORIDA NO. 60

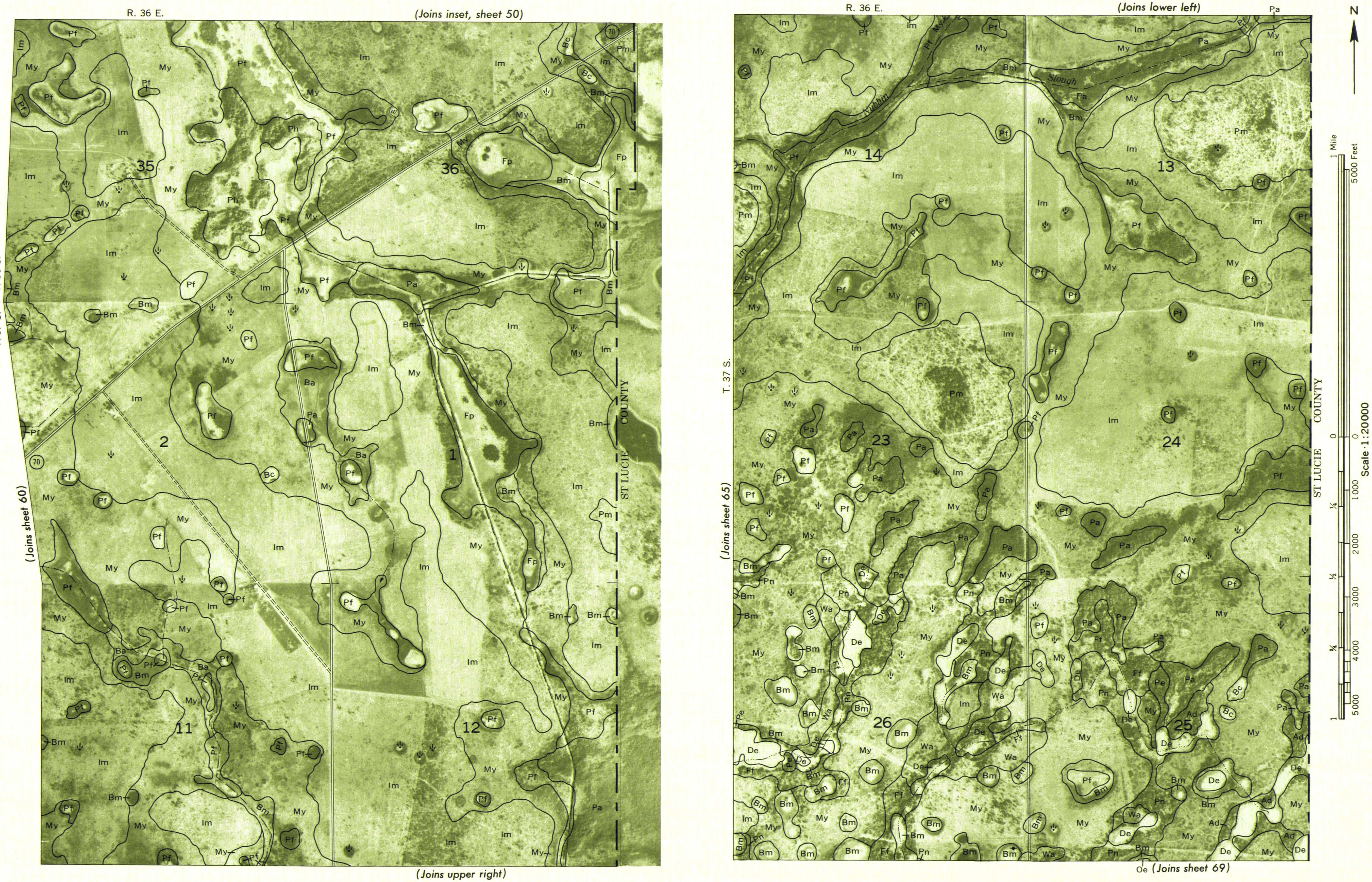
Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 61



(Joins sheet 56) | (Joins sheet 57)

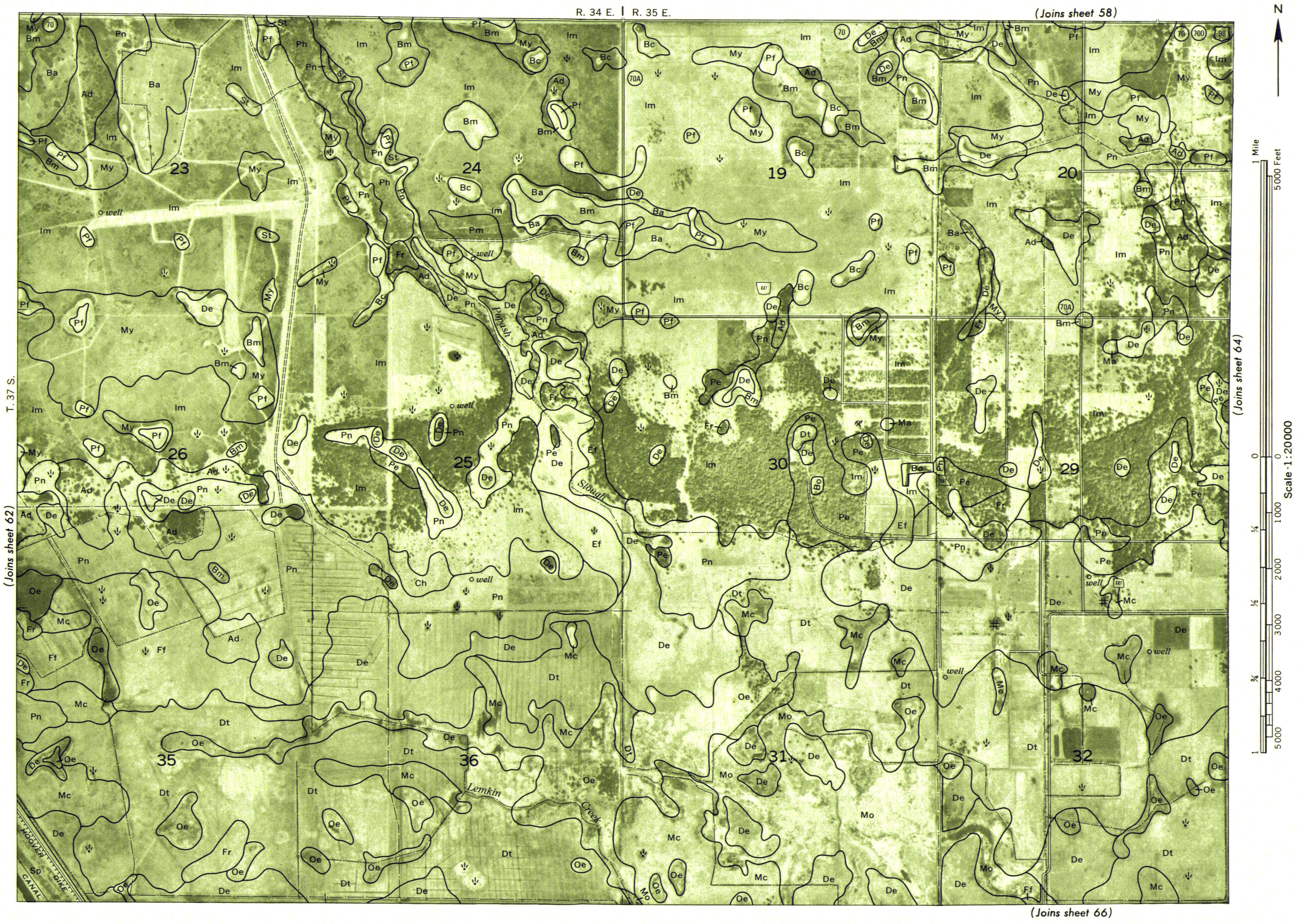
(Joins sheet 63)

(Joins inset, sheet 56)

OKEECHOBEE COUNTY, FLORIDA NO. 62

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

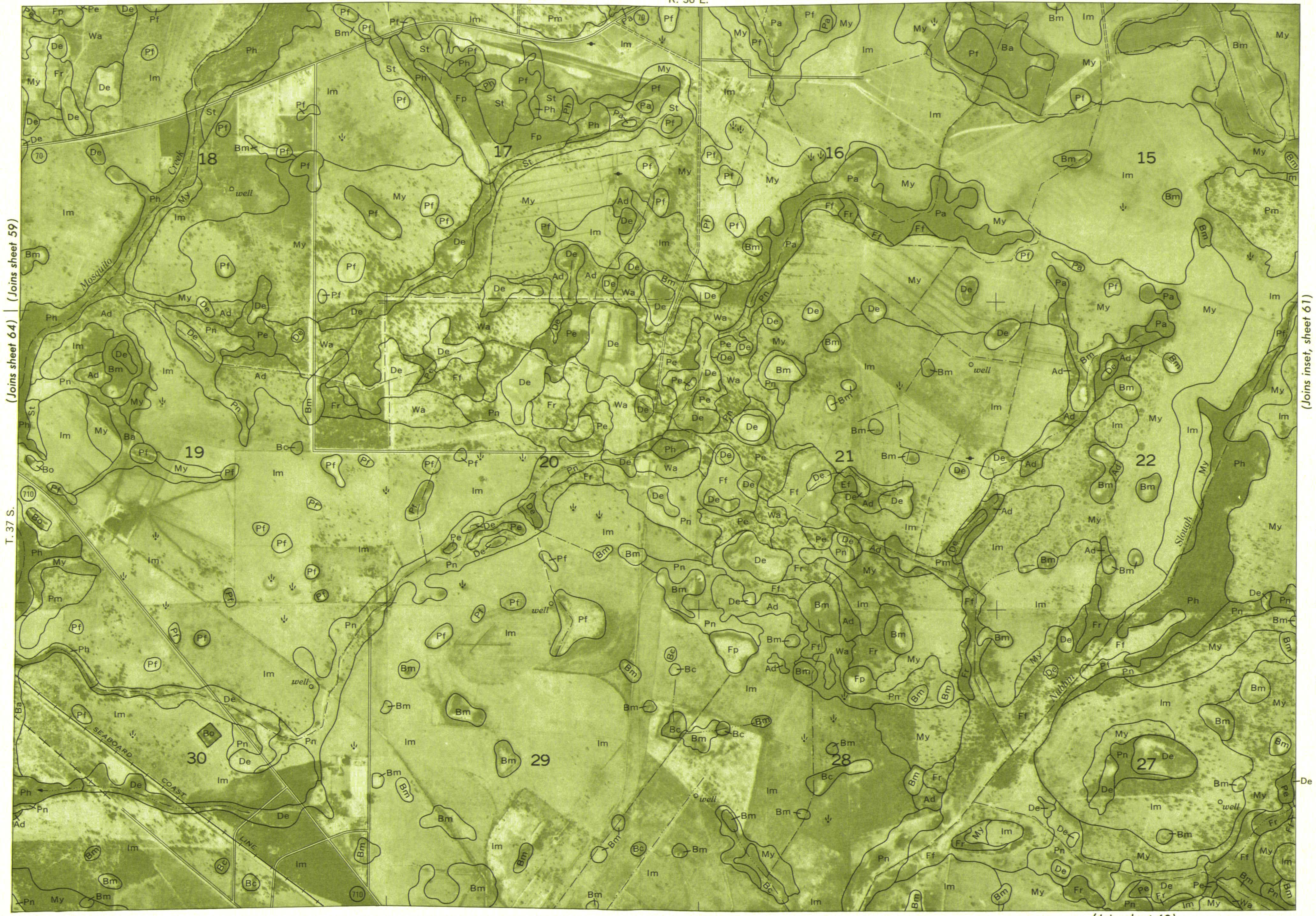


This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 64

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



N

1 Mile
5000 Feet
0
¼
½
¾
1
0
1000
2000
3000
4000
5000
Scale 1:20000

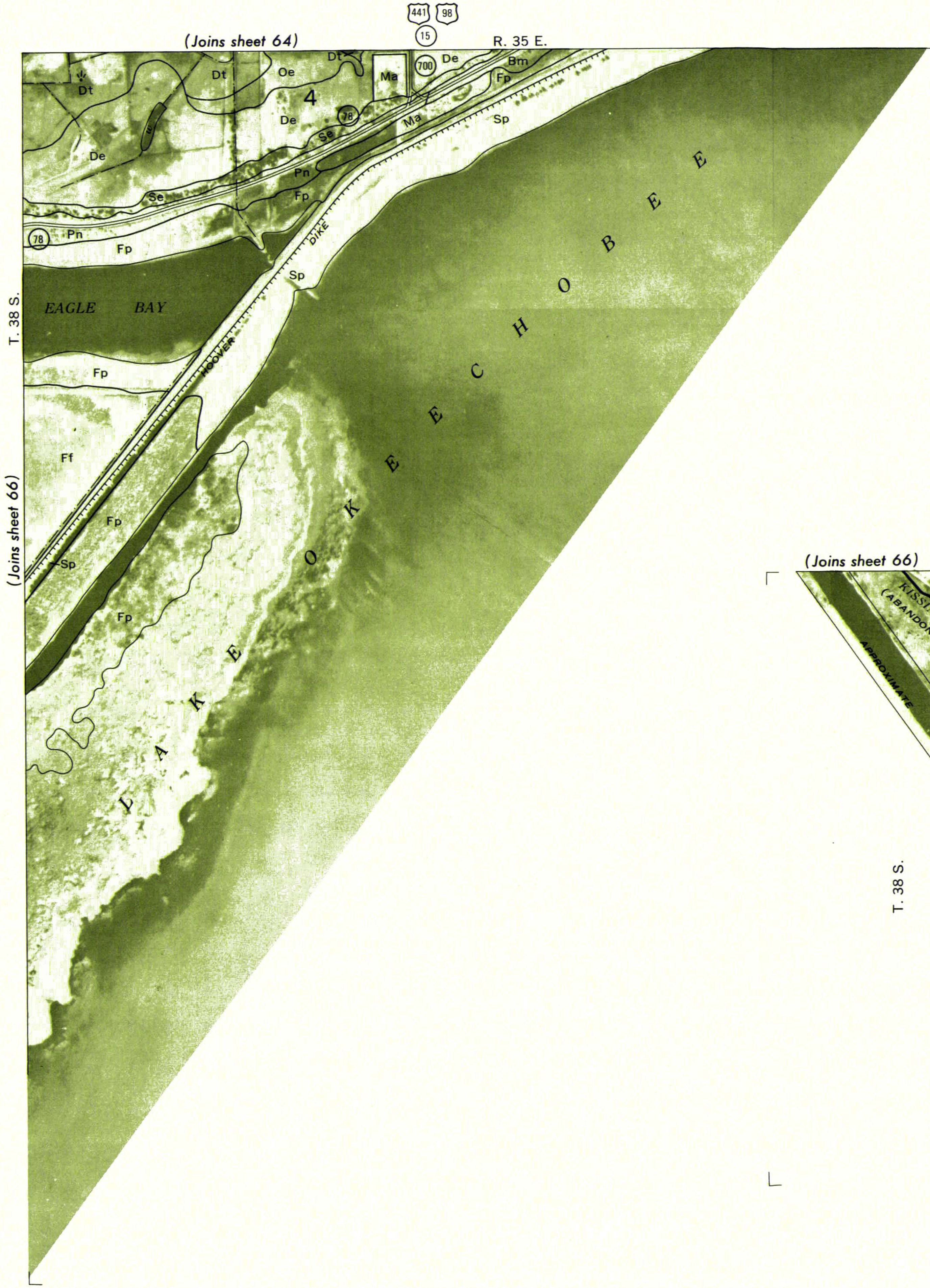
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.
OKEECHOBEE COUNTY, FLORIDA NO. 65

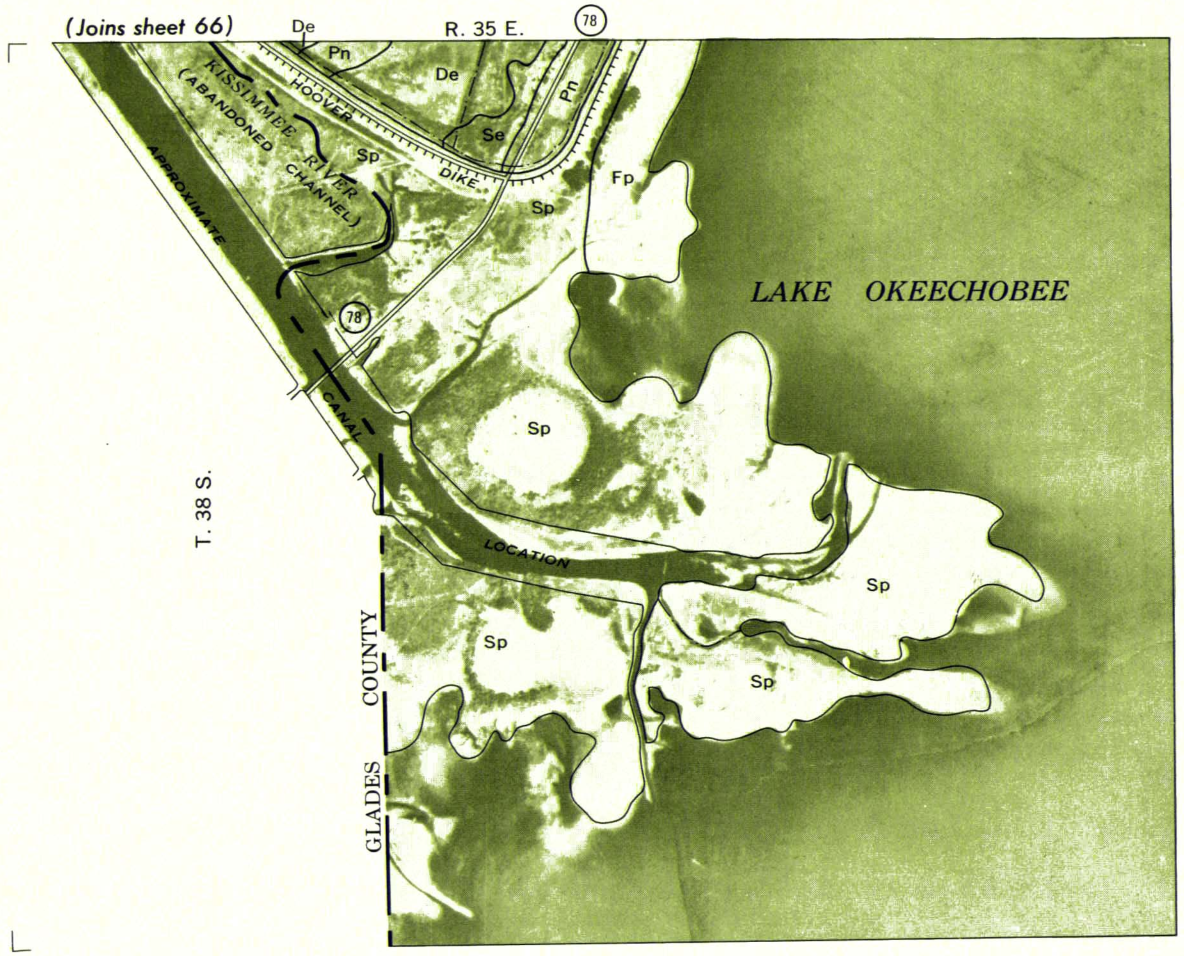
OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 66

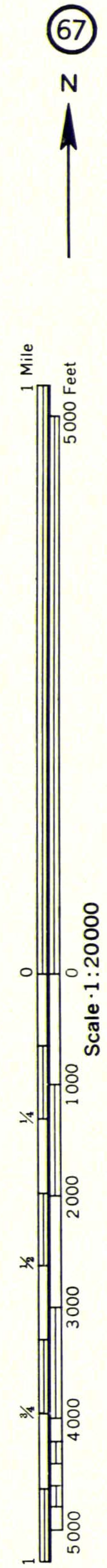
OKEECHOBEE COUNTY, FLORIDA NO. 66

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.







This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 68

(68)

N

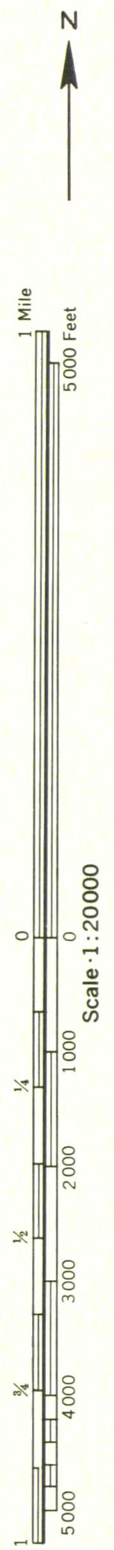
Scale 1:20000

1 Mile
5000 Feet

OKEECHOBEE COUNTY, FLORIDA NO. 68

Land division corners are approximately positioned on this map.

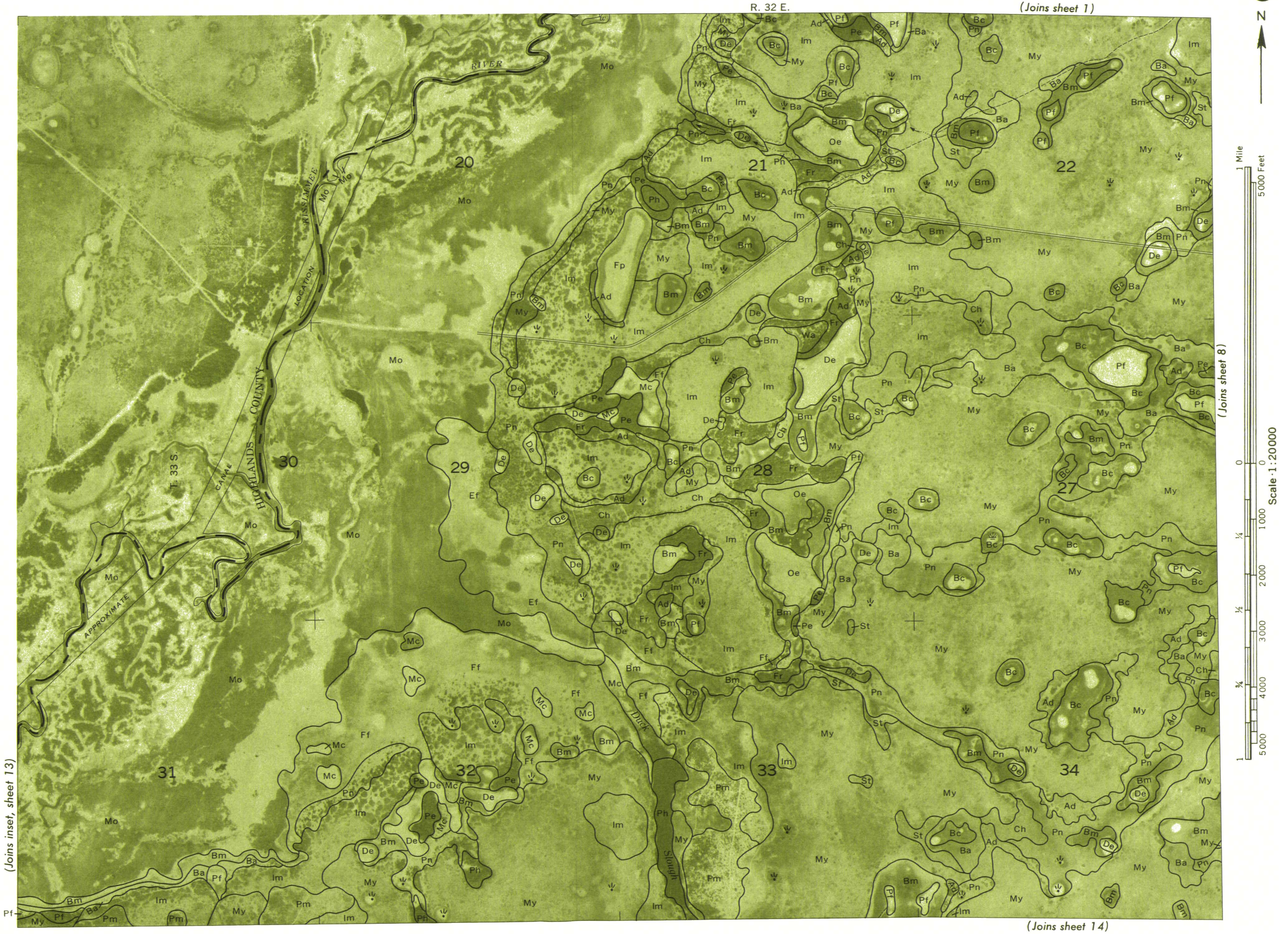
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

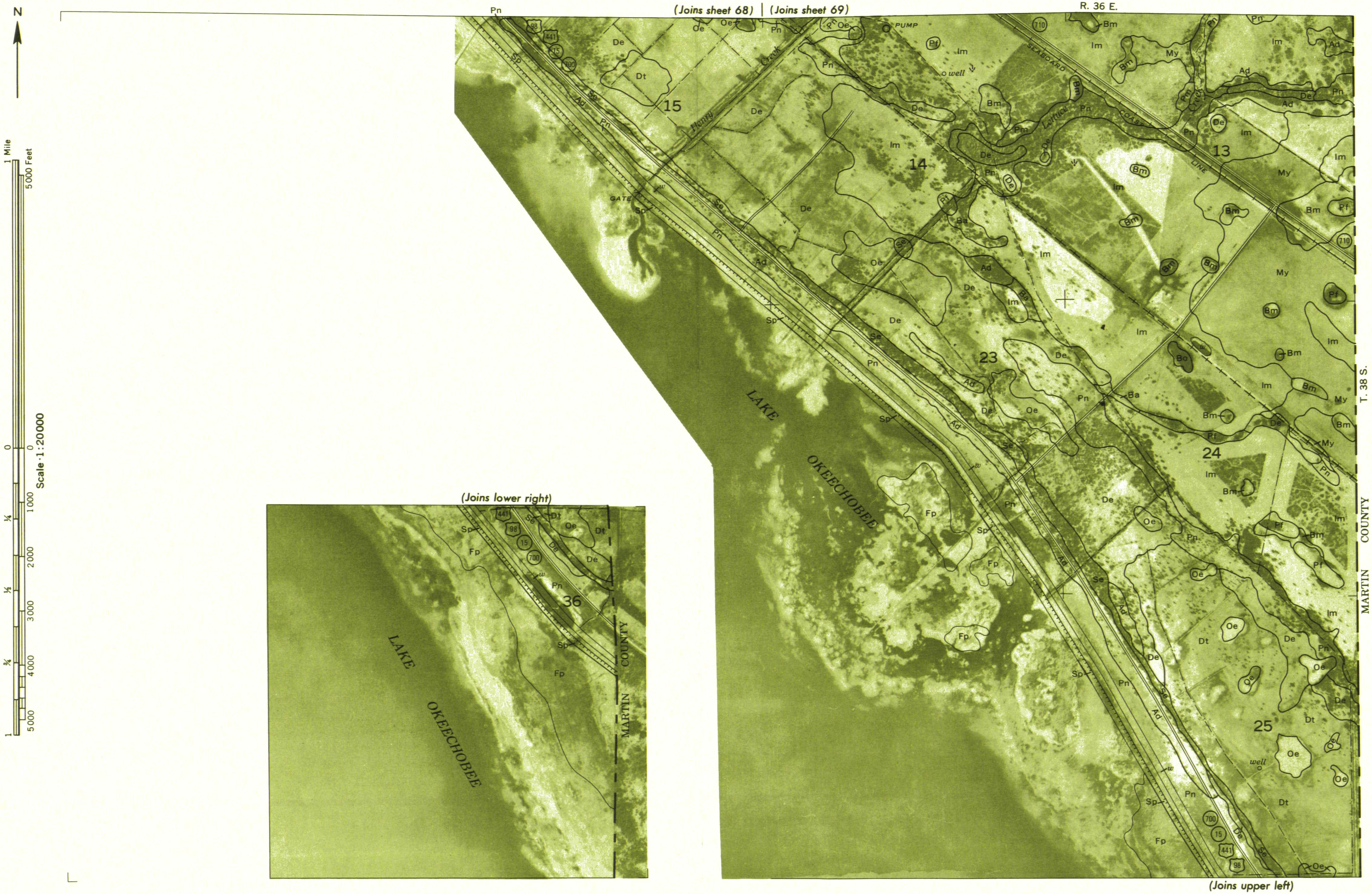
OKEECHOBEE COUNTY, FLORIDA NO. 69

7



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 7



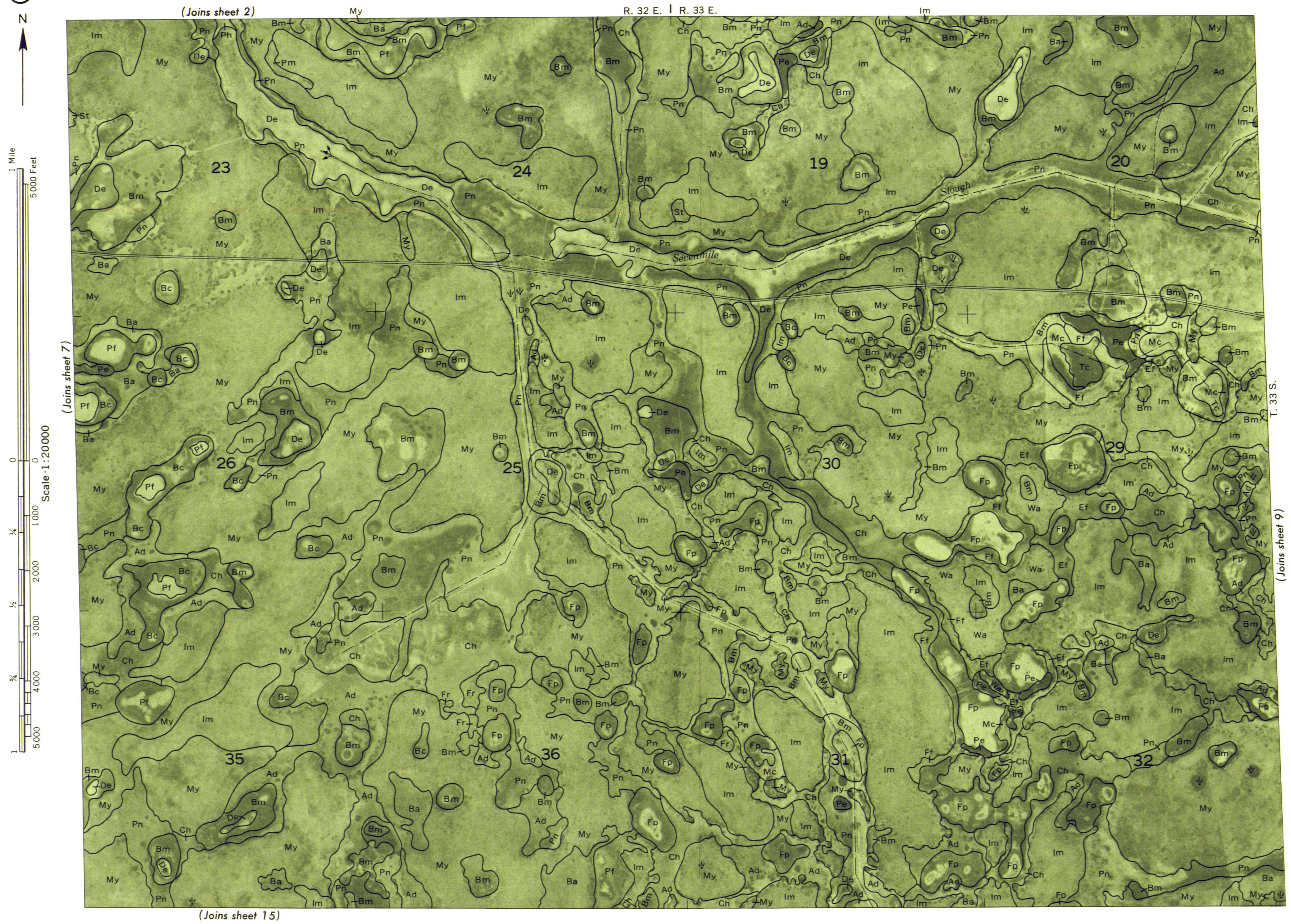
OKEECHOBEE COUNTY, FLORIDA NO. 70

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

8

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 8

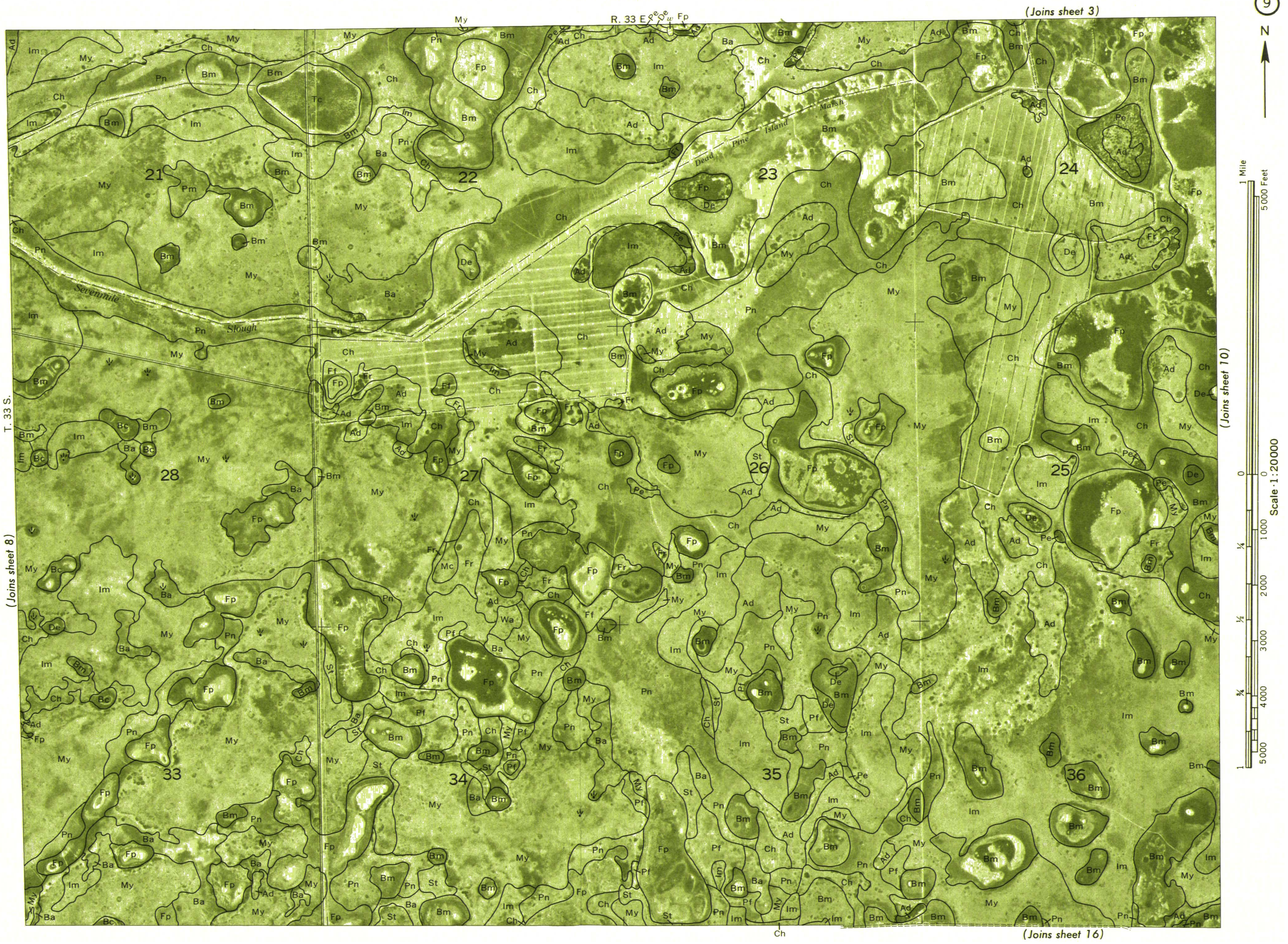


OKEECHOBEE COUNTY, FLORIDA NO. 8

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.

OKEECHOBEE COUNTY, FLORIDA — SHEET NUMBER 9



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the University of Florida Agricultural Experiment Stations.
Land division corners are approximately positioned on this map.

OKEECHOBEE COUNTY, FLORIDA NO. 9

SOIL LEGEND

SYMBOL	NAME
Ad	Adamsville fine sand
Ba	Basinger fine sand
Bc	Basinger-Placid complex
Bm	Basinger and Pompano fine sands, ponded
Bo	Borrow pits
Br	Bradenton fine sand
Ch	Charlotte fine sand
Co	Chobee fine sandy loam
De	Delray fine sand
Dt	Delray fine sand, thin solum variant
Ef	Elred fine sand
Ff	Felda fine sand
Fp	Felda, Pompano, and Placid soils, ponded
Fr	Ft. Drum fine sand
Im	Immokalee fine sand
Ma	Made land
Mc	Manatee loamy fine sand
Mo	Manatee, Delray, and Okeelanta soils
My	Myakka fine sand
Oe	Okeelanta peat
Pa	Pamlico muck
Pd	Paola fine sand
Pe	Parkwood fine sand
Pf	Placid fine sand
Ph	Placid, Pamlico, and Delray soils, ponded
Pm	Pomello fine sand
Pn	Pompano fine sand
Se	Seewee fine sand
Sp	Spoil banks
St	St. Johns sand
Tc	Terra Ceia peat
Wa	Wabasso fine sand

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Dual
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under

Tunnel

Buildings
- School
- Church

Mine and quarry

Gravel pit

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Well, oil or gas

Forest fire or lookout station

Windmill

BOUNDARIES

- National or state
- County
- Reservation
- Land grant
- Small park, cemetery, airport
- Land survey division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches (CANAL)

Lakes and ponds
- Perennial (water, w)
- Intermittent (int)

Spring

Marsh or swamp

Wet spot

Alluvial fan

Drainage end

Well, irrigation (well)

Well, artesian

RELIEF

Escarpments
- Bedrock
- Other

Prominent peak

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stoniness: Stony; Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully
- Indian mound

Soil map constructed 1969 by Cartographic Division, Soil Conservation Service, USDA, from 1962 aerial photographs. Controlled mosaic based on Florida plane coordinate symbol, south zone, transverse Mercator projection, 1927 North American datum.